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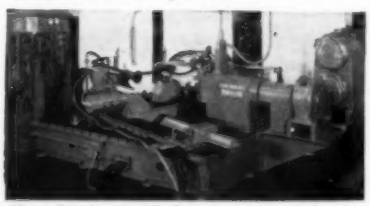

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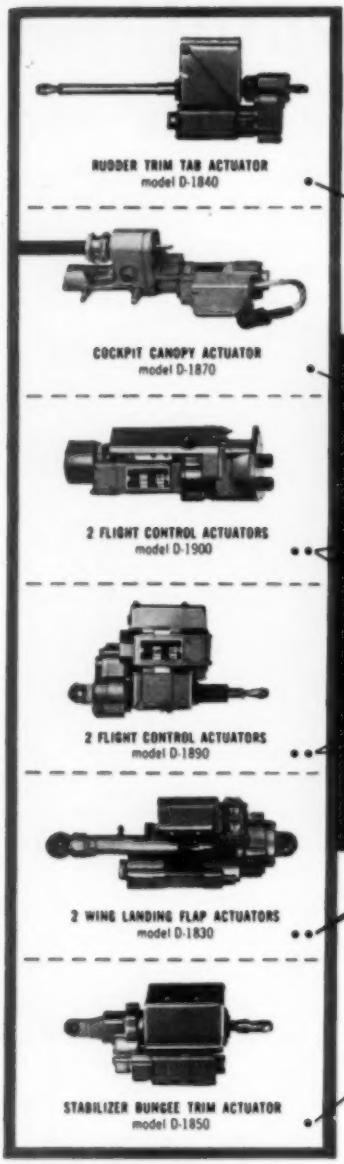

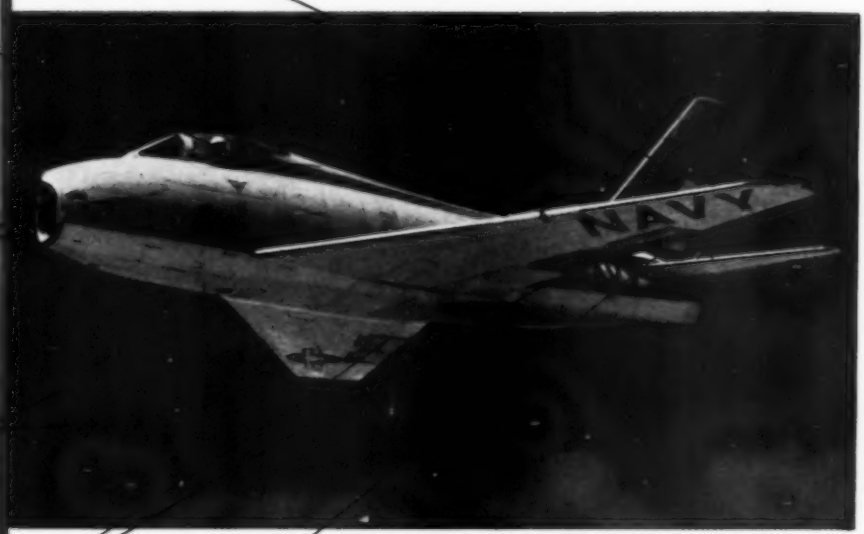

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Personal View

By WAYNE W. PARRISH

The Lawyers Discover Outer Space, Too

HOLD your hats, lash down the roofs. Better yet, head for the nearest coal mine.

Between jets, satellites and international lawyers, we're in for a rough time ahead.

We took the initial announcements about satellites in our stride but we overlooked the lawyers. We should have known they wouldn't neglect a good bet.

Now comes Dr. John C. Cooper, of Princeton, N.J., and professor of law at the Institute of International Air Law, McGill University, posing what appear to be rather stupendous problems about satellites that have nothing to do with whether they'll work.

He says satellites and rockets require legal flight rules which will have to be worked out by a new international air convention. That means governments and, of course, the international lawyers.

Dr. Cooper should know what he's talking about. He's had a long and distinguished career in air law and, among other things, is legal adviser to the International Air Transport Association, a tie-up which will come in handy if satellites ever start carrying passengers on round-trip tourist excursions.

Pause a moment and reflect the changes of airspace concept that are now occurring. There was a time when the law declared that every owner of land controlled everything below and above. Then nations assumed this sovereignty of airspace.

But look what's proposed now. Dr. Cooper suggests that a ceiling (or is it a roof?) will have to be established to a nation's sovereignty over its own airspace, say 300 miles upstairs. Everything over that would be available to everyone as it is now over the open seas.

First we put a fence around each country and said all airspace within the fence was sovereign to each. Nobody thought of anything except unlimited altitude. Now it is proposed that a roof (or is it a ceiling?) be placed over it.

Twenty years ago we all talked about the unlimited ocean of the air and all the freedom it meant for airplanes. Now we're talking about putting airspace into cubic containers. The traffic controllers tell us that airspace is rapidly vanishing. The international lawyers are now putting a 300-mile depth limit to it. Pretty soon even breathing the air will go under controls.

A short decade ago Dr. Cooper's discussion would have been brushed off with whimsical amusement. Today it isn't humorous; it is a problem requiring attention and action.

All previous air conventions have dealt only with those flight instrumentalities which derive support in the atmosphere from reactions of the air. This means balloons and airplanes. But rockets, satellites and other space craft are designed to move through space without atmospheric support. Earlier air conventions made no provision for them.

The maximum height reached by a V-2 rocket of World War II was 114 miles. An American rocket has been publicly stated to have reached an altitude of 250 miles. A manned balloon has reached 72,395 feet and the highest airplane flight record is 90,000 feet. Now all the talk is in the area of 300 miles altitude and up.

It was announced last summer that as part of the wide scientific investigation of the 1957-1958 International Geophysical year, we will drive a three-stage rocket at least 200 miles above the earth's surface, carrying in its nose the satellite. Thus the legal problem will soon be upon us.

Dr. Cooper has given to the American Society of International Law some practical suggestions. He proposes a new international air convention which would:

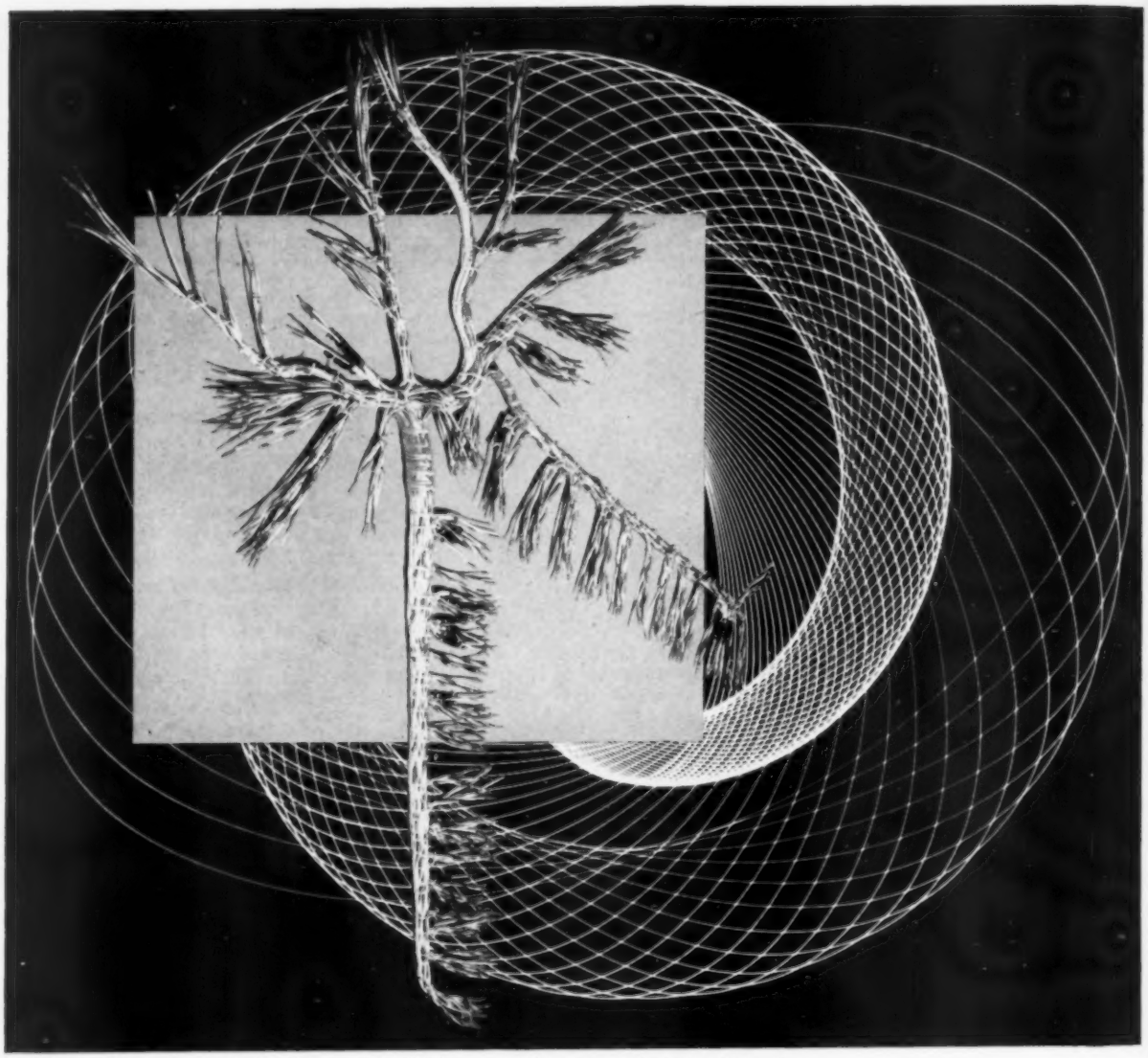
(a) Reaffirm Article I of the Chicago Convention of 1944, giving each State full sovereignty in the areas of atmospheric space about it, up to the height where "aircraft" as now defined, may be operated, such areas to be designated "territorial space".

(b) Extend the sovereignty of each State upward to 300 miles above the earth's surface, designating this second area as "contiguous space", and provide for a right of transit through this zone for all non-military flight instrumentalities when ascending or descending.

(c) Accept the principle that all space above "contiguous space" is free for the passage of all instrumentalities.

It is apparent that some such solution will be needed. It is also apparent that very few experts have given much thought to the matter. Dr. Cooper has performed a valuable service by setting forth his suggestions which we have referred to only very briefly. It should be noted in passing that the International Civil Aviation organization has scheduled a report on the outer space problem at its assembly meetings in Caracas, Venezuela, next month.

And while we're on the subject of rockets and satellites, we shouldn't overlook another bit of air history now in the making. The United States Air Force will not order a single piston-engined airplane in fiscal year 1957, which begins July 1 of this year. There are still some deliveries to be made on prior orders, but for all intents and purposes USAF is now switching over exclusively to the age of jet. Times have always changed but they've never changed so rapidly as now.



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AUTOMATIC CONTROLS MAN HAS NEVER BUILT BEFORE

Washington Report

More Aviation for Army

Army's drive for an autonomous air force free of USAF control got a real boost when Pentagon decided last month to let Army train its own fliers.

This did not rankle Air Force so much as the decision to transfer two AF bases in Texas to the Army for use as flying schools. Soldiers this summer will take over Gary AFB, San Marcos, for fixed-wing pilot training, and Wolters AFB, Mineral Wells, for cargo helicopter pilot courses. Both bases will be operated by private contractors.

Army also is assuming a more important role in the area of aircraft research and development. Last month, it gave Fairchild a million-dollar contract for design and construction of a VTOL-STOL aircraft.

IATA: Statesmanship or Cartel?

Civil Aeronautics Board has done a complete about-face in six months in its evaluation of International Air Transport Association.

Said CAB Chairman Ross Rizley last October at the IATA general meeting in New York: ". . . you have reduced the need for governmental supervision to a minimum, by statesmanship of a high order."

With Rizley still at the helm, CAB last month told Congress in pushing its case for control over international fares and rates (see p. 77):

"Without effective rate power in the Board there is no effective governmental control over IATA and it assumes the status of a monopolistic price-fixing cartel. No proper concept of governmental responsibility can justify leaving the ultimate determination of a fair and reasonable international rate structure wholly in the hands of an all-embracing international cartel."

State's 'False Economy'

Some segments of the industry are becoming increasingly disturbed over the "stepchild" treatment being given by Congress and State Department to financing of U.S. delegations to international meetings.

State's purse-strings have been pulled so tight that advisers from industry, and in some instances those attached to other government agencies, are being asked to pay their own way.

Industry concern is not so much with the money involved as the principle of the matter. Many feel that this is "false economy" since official delegation members very often couldn't protect U.S. interests intelligently without technical assistance.

• **A case in point:** At ICAO's recent Caribbean regional air navigation conference in the Dominican Republic six "advisers" supplementing an 11-man government delegation had to foot their own bills. Three of these were from industry, two from Air Force and the sixth from Commerce.

At stake: a proposed air traffic control plan for the Caribbean area, a matter of vital importance to U.S. interests and one that could not properly be resolved without these advisers.

'How to Deal with Durfee'

A new technique in how to "deal" with government officials turned up in Washington last month.

When new CAB Chairman James R. Durfee assumed his duties April 23 (see p. 77), he discovered that a firm from his home state of Wisconsin was offering for sale—$75 per copy—an intelligence-type report on "how to get along and do business with" the new Chairman.

The report was prepared by three former FBI agents who solicited U.S. airlines through the firm name of Special Agents Research Corp., 409 Carpenter Bldg., Milwaukee.

Included in the report, according to the soliciting letters, is a comprehensive investigation of Durfee's political associations, qualifications, his rise from a practicing attorney to high public offices, his personality, etc.

AIA-AF Squabble

Present squabble between Aircraft Industries Association and Air Force over such items as AF approval of executive salaries and supplying lists of subcontractors in advance of receiving production orders (see p. 23) is somewhat reminiscent of previous efforts by the services to tighten up on procurement spending.

Two years ago, Defense Dept. tried to cut progress payments in favor of manufacturers getting private production financing. This went by the boards, just as did last year's hassle over cutting development cycles for aircraft engines.

Settlement of the present disagreement is expected before the Williamsburg, Va., meeting later this month of the AIA board of governors.

JCS Chairmanship to AF?

Retirement of Army Gen. Alfred M. Gruenther has improved chances for an Air Force officer being named chairman of the Joint Chiefs of Staff next year. Gruenther frequently had been reported in line for the job. Best bet now is that Gen. Nathan F. Twining will get the nod.

Big question is a successor to Twining as AF Chief of Staff. Appointment of Gen. Lauris Norstad to succeed Gruenther as NATO Supreme Commander almost certainly rules him out.

Five other officers are in line for the post: Gen. Thomas D. White, now vice chief; Gen. Laurence S. Kuter, now head of Far East Air Forces, and the chiefs of the three major AF commands—SAC's Curtis LeMay, TAC's Otto P. Weyland and ADC's Earle Partridge.

Industry News Digest

Air Force to Use Fiscal '57 Funds To Build Successor to B-52

Fiscal 1957 money will be used by the Air Force to prepare for 1958 production of a new bomber to succeed the B-52, according to testimony before the House Military Appropriations Subcommittee. No indication was given as to the plane but it is believed to be the WS-110A, chemically fueled bomber on which Boeing and North American are working.

Other preproduction funds will be utilized to lay the groundwork for output of the Convair B-58 supersonic delta, it was reported. Other highlights of USAF testimony:

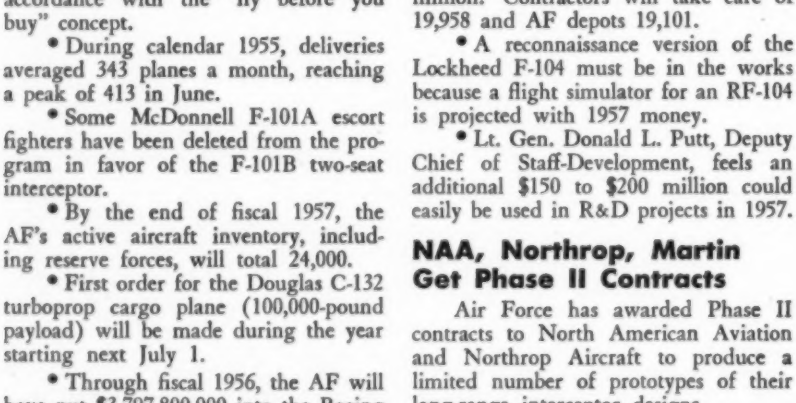
- No production orders will be made in 1956 for either the B-58 or the Republic F-105 fighter-bomber in accordance with the "fly before you buy" concept.
- During calendar 1955, deliveries averaged 343 planes a month, reaching a peak of 413 in June.
- Some McDonnell F-101A escort fighters have been deleted from the program in favor of the F-101B two-seat interceptor.
- By the end of fiscal 1957, the AF's active aircraft inventory, including reserve forces, will total 24,000.
- First order for the Douglas C-132 turboprop cargo plane (100,000-pound payload) will be made during the year starting next July 1.
- Through fiscal 1956, the AF will have put $3,797,800,000 into the Boeing B-52 program from procurement and production funds.
- Three wings for SAC have been deleted and added to TAC under the current version of the 137-wing program. New makeup is SAC 51 wings, TAC 41, ADC 34 and airlift 11.
- According to Maj. Gens. Samuel R. Brentnall (Assistant Chief for Guided Missiles) and Bernard A. Schriever, head of the Western Development Division, no new inventions are needed to attain the AF's ICBM and IRBM. They involve "a systems engineering job of great magnitude and testing."
- In fiscal 1957, 8,489 aircraft will be overhauled and modified at a cost of $246.8 million. AF depots will handle 1,940, commercial contractors 6,549.
- Engine overhauls will involve 39,059 power plants and will cost $120.5 million. Contractors will take care of 19,958 and AF depots 19,101.
- A reconnaissance version of the Lockheed F-104 must be in the works because a flight simulator for an RF-104 is projected with 1957 money.
- Lt. Gen. Donald L. Putt, Deputy Chief of Staff-Development, feels an additional $150 to $200 million could easily be used in R&D projects in 1957.

NAA, Northrop, Martin Get Phase II Contracts

Air Force has awarded Phase II contracts to North American Aviation and Northrop Aircraft to produce a limited number of prototypes of their long-range interceptor designs.

A Phase II contract also went to The Glenn L. Martin Co. for a supersonic tactical bomber, to succeed Martin's B-57 and Douglas' B-66.

Demon Leaves Deck of Forrestal



This unusual photo, taken during recent tests on the USS Forrestal, shows a McDonnell F3H-2N just as the landing gear cleared the canted deck of the big carrier. The Demon was launched by steam catapult. The F3H-2N is powered by an Allison J71, with afterburner.

Douglas Sets Record, Billion-Dollar Backlog

For the first time in aircraft manufacturing history, one company—Douglas Aircraft Co.—last month reported a commercial backlog of more than $1 billion.

Total at the end of the first quarter of the fiscal year (Feb. 29) was $934,485,000, but this did not include more than $100 million for Eastern Air Lines' 20 DC-8s. This boosted the total to over $1 billion. Douglas sold 248 commercial planes in the last 12 months.

Air Force Reveals Two New Versions of B-57

Air Force and The Martin Co. have taken the wraps off two new versions of the B-57 twin-jet light bomber. New designations are the RB-47D and B-57E, both of which have made first flights.

RB-47D is a high-altitude testbed using two Pratt & Whitney J57 engines instead of the Wright J65s which are standard on B-57s.

The B-57E is similar to the B-57B but is specially fitted to carry up to four aerial targets in high-speed, high-altitude rocketry practice.

AF Awards 5 Contracts For ICBM Facilities

Five major facilities contracts in support of the Convair Atlas intercontinental ballistic missile program have been awarded by USAF.

They include AVCO, Stratford, Conn., $1,425,000; Burroughs Corp., Detroit, $400,000; General Electric, Syracuse, $861,800; Sperry-Rand, St. Paul, Minn., $155,400; Western Electric, New York City, $500,000. The latter contract also covers Martin's Titan.

Other facilities contracts also believed to be tied in with the ICBM program are: $6,463,000 to North American Aviation, Los Angeles, to produce and test rocket engines, and three contracts totaling $5,768,000 to Air Products, Inc., Allentown, Pa., for liquid oxygen and nitrogen.

Rentschler, United Aircraft Board Chairman, Dies

Frederick B. Rentschler, 68, chairman of the board of United Aircraft Corp. since 1935, died Apr. 25 at his home in Boca Raton, Fla.

Rentschler served in the U.S. Air Service in World War I. In 1919 he organized Wright Aeronautical Corp., Pratt & Whitney in 1924, and United Aircraft and Transport Corp. in 1928. In 1935, he became chairman of the re-named United Aircraft Corp.

LeMay Asks: Better Technicians, Crews --- Plus More B-52s and KC-135s

The Strategic Air Command has many problems, Gen. Curtis LeMay told the Symington Airpower Subcommittee last week, but its "most critical" is a shortage of skilled technicians and professional combat crews. (See story on page 24.)

After this, he indicated, SAC needs: more B-52s, more KC-135 jet tankers and more Zone-of-Interior bases.

In two days of hearings, however, LeMay had no specific numbers to offer, nor did he discuss the relationship between his needs and recent Administration requests for more AF funds.

• **To meet** his personnel requirements, LeMay offered a 5-point package program: pay increases, adequate family housing, complete medical care for dependents, a return to lower prices at commissaries and base exchanges, and educational benefits.

He painted a glowing picture to be expected from these proposals—the equivalent of six and one-half effective air wings at present equipment levels, worth about $2.5 billion.

This would result, he said, from an estimated 25 to 60 percent increase in SAC's reenlistment rate and a 25 to 50 percent boost in its officer retention rate.

• **But LeMay** had somber contrasts to offer between the Soviet and U.S. Air Forces:

• The Soviet AF is a "professional one"; the USAF is not.

• The Soviet air officer has higher pay, greater benefits, and more prestige than his U.S. counterpart.

• Russia's long-range striking capability is growing; SAC's, relatively, is decreasing from its peak of efficiency, reached in 1951.

• The USSR now has in inventory more modern long-range bombers than the U.S. has B-52s—and by 1958-60 will have "substantially more" at present and programmed rates of production.

LeMay explained that SAC needed a greater long-range striking force than the Soviets possessed if it was to serve its deterrent purpose, i.e. be able to absorb a surprise Russian attack and retaliate.

A serious deficiency, however, existed in SAC's Z. I. base structure, he said. And even with a speed-up in construction, 1960 would still find the system inadequate.

In the context of a carefully prepared—and undeviatingly followed—series of 44 questions and answers, LeMay appeared to stress SAC's need of more KC-135 jet tankers. If an immediate production boost were ordered here, he said, SAC's long-range striking power would be "considerably" increased by 1960—even if there was no accompanying increase in B-52s and bases.

And "first priority" should go to the ICBM program, LeMay added. He added, however, that the "foreseeable future" held little likelihood that the ICBM would replace the manned bomber.

CAA Gives ATC Plan To House Committee

CAA's five-year air traffic control and airway plan involves a capital expenditure of $246 million and an annual operating cost of $146 million, it was revealed before the House Appropriations Committee.

The original plan (AMERICAN AVIATION, Oct. 24, 1955), prior to approval by the full Air Coordinating Committee, was boosted to provide for the establishment of more facilities in fiscal 1957, for which $40 million had been requested. The request was cut to $37.5 million by the committee.

Objectives of the plan were outlined to the committee by Joseph H. Tippets, director of CAA's Office of Airways. They include, he said, "blanket coverage for communications from the pilot to the controller on all controlled routes."

"Over the five-year period," Tippets added, "we must increase our radio navigation system to give similar coverage down to 700 feet along the controlled airways; and blanket coverage at 15,000 feet and above throughout the U.S. . . .

To accomplish this, the CAA plan proposes accelerated installation of radar, peripheral communications, navigation and air traffic control equipment (AMERICAN AVIATION, April 23).

Fairchild to Put F-27 In Volume Production

The Fokker-designed F-27 40-passenger twin-engined turboprop transport will be put into volume production by Fairchild Engine & Airplane Co. at Hagerstown, Md.

Fairchild, which has firm orders for 14 planes and options for 20 more, exercised its option with Fokker for immediate delivery of all drawings and engineering data on the aircraft. The first Fairchild-produced F-27 is scheduled for delivery to Mackey Airlines, Ft. Lauderdale, Fla., in October, 1957. Fairchild has quoted the plane's price as $540,000 ("plug-in radio units extra").

Initial production will be five a month, with capacity to increase to 10. Fairchild's orders include: Mackey, two firm, two optional; West Coast Airlines, four firm, four optional; Frontier Airlines, two firm, four optional. A fourth airline has ordered six and optioned 10, but Fairchild did not identify the buyer.

Fairchild also plans to build with its own money a prototype of its M-185 eight-passenger jet utility plane. Four Fairchild J83s, rated at 2,000 pounds thrust, will be used.

(*Continued on Page* 15)

ARDC's Missile Component Tester

Missile contractors are using a Lockheed F-94 to test guidance systems, telemetering sets, electronic systems and other specialized equipment used in pilotless aircraft. The components are housed in this special nose-mounted radome. Tests are being conducted at Air Research and Development Command's missile test center in Florida.

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Stratos compressors for high pressure pneumatic systems cover a wide range of rated volume delivery and applications.

Models are available either as complete packages, or as basic compressors only. Complete units include electric or hydraulic motors, interstage coolers, moisture separators and automatic controls. Certain models can be ordered with or without controls, with provisions for a variety of drives—electric, hydraulic or turbine. For the basic units, controls and ancillary equipment such as pre-coolers and aftercoolers can be provided to match the specific aircraft requirements.

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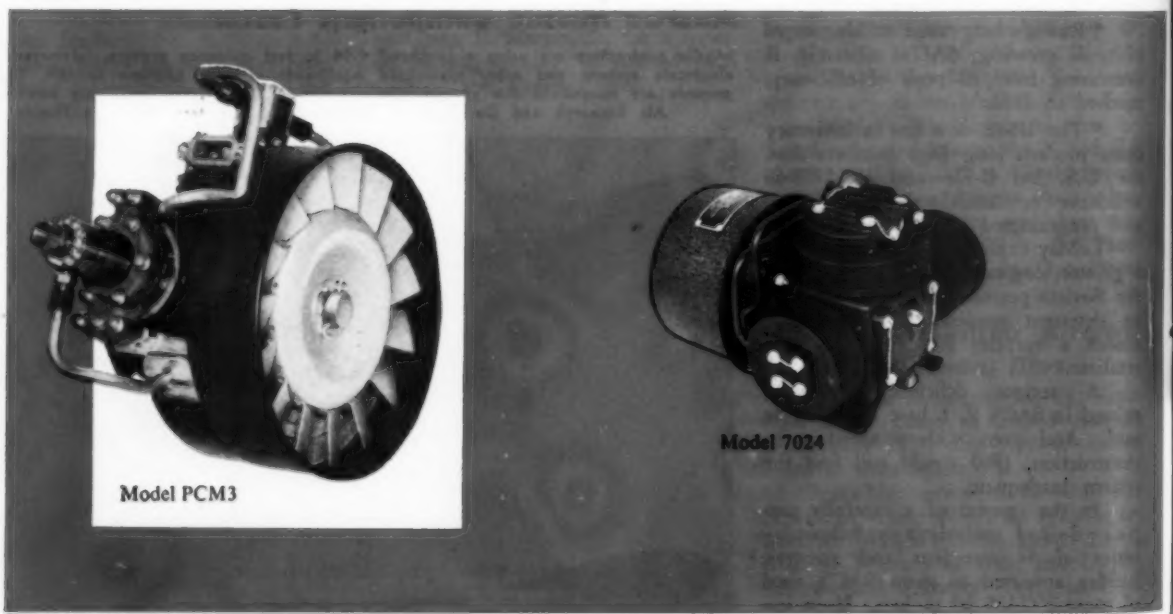

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America's Major Aviation Show for All of the Armed Services

In keeping with its plan of rotation, the U. S. Department of Defense has designated Oklahoma City the site of this year's aviation classic—the National Aircraft Show.

Here, for the first time in the southwest, the aviation industry in cooperation with the Armed Services will dramatically report to the nation the progress of our air power.

It is the only major show for 1956 approved by the U. S. Department of Defense and sanctioned by the National Aeronautic Association. It will carry full participation by all branches of the Armed Services, both in flying demonstrations and static exhibits of aircraft and equipment.

Spacious hangars for indoor displays and vast outdoor exhibit areas offer airframe, engine and component parts manufacturers a singular opportunity to effectively present their latest developments to all the Services, the industry and public . . . for this is aviation's traditional annual rendezvous. It merits your serious consideration and active participation.

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When & Where

MAY

May 6-9—Second National Flight Test Instrumentation Symposium, Instrument Society of America, Hotel Texas, Ft. Worth, Tex.

May 14-15—National Aeronautical and Navigational Conference, Hotel Biltmore, Dayton, Ohio.

May 14-16—National Conference on Aeronautical Electronics sponsored by IRE Engineers Professional Group on Aeronautical and Navigational Electronics and IAS, Hotel Biltmore, Dayton, Ohio.

May 17-21—Federation Aeronautique Internationale 1956 General Assembly, Vienna, Austria.

May 20—Annual Air Show sponsored by Birmingham Aero Club, Birmingham NAS, Ala.

May 24-26—Tenth annual convention of Armed Forces Communications and Electronics Association, Statler Hotel, Boston.

May 27-June 3—Annual Convention, Aviation Writers Association, San Francisco.

JUNE

June 2—Seventh annual maintenance and operations meeting, Reading Aviation Service, Inc., Municipal Airport, Reading, Pa.

June 3-8—Summer meeting Society of Automotive Engineers, Hotel Chalfonte, Atlantic City.

June 4-8—National Fire Protection Association, 60th annual meeting, Boston.

June 5-6—Radio Technical Commission for Aeronautics spring meeting with Boston sections of IRE and IAS, Boston.

June 6-8—American Society for Quality Control, Palais Du Commerce, Montreal, Canada.

June 12-14—Radio - Electronics - Television Manufacturers Association convention, Edgewater Beach Hotel, Chicago.

June 13—B. F. Goodrich Technical Forum sponsored by Atlantic Aviation Corp. and Airwork Corp., Teterboro Airport, N. J.

June 17-21—Semiannual meeting American Society of Mechanical Engineers, Hotel Statler, Cleveland.

June 18-21—National summer meeting of Institute of Aeronautical Sciences, IAS Building, Los Angeles.

June 19—Tenth session of International Civil Aviation Organization Assembly, Caracas, Venezuela.

June 20-22—Aviation Distributors and Manufacturers Association 27th annual meeting, Grove Park Inn, Asheville, N. C.

June 30—Jet age conference, Sheraton-Jefferson Hotel, St. Louis, Mo.

JULY

July 7-10—Tenth annual All-Woman Transcontinental Air Race, San Mateo County (Calif.) to Flint, Mich.

July 10-Aug. 9—International Aviation Exposition, Mexico City.

AUGUST

Aug. 1-5—Air Force Association annual convention, Roosevelt Hotel and Municipal Auditorium, New Orleans.

Aug. 3-5—Experimental Aircraft Assn. 4th Annual Fly-In, Oshkosh, Wis.

Aug. 15-17—IAS National Turbine-powered Air Transportation Meeting, Grant Hotel, San Diego, Calif.

Aug. 21-24—Western Electronics Show and Convention, sponsored by IRE and West Coast Electronic Mfrs. Assn., Pan-Pacific Auditorium, Los Angeles.

Aug. 22-24—Bendix Scintilla Int'l Ignition Conference, Sidney, N. Y.

SEPTEMBER

Sept. 1-3—1956 National Aircraft Show, Will Rogers Field, Oklahoma City.

Sept. 3-9—Society of British Aircraft Constructors exhibition and flying display, Farnborough, England.

Sept. 12-22—International Air Races, U.S., England, South Africa.

Sept. 25-29—International Association of Aircraft Constructors jet transport conference, The Hague.

OCTOBER

Oct. 1-3—National Association of State Aviation Officials annual meeting, Lake Placid, N. Y.

Industry News Digest

Two Firms to Build Jet Simulators

Firm orders by a pair of U.S. airlines and one aircraft manufacturer have sent two firms into production to supply electronic flight simulators for jet transports.

Link Aviation, Inc. of Binghamton, N. Y. has signaled its entry into the jet transport flight simulator business with firm orders from Douglas Aircraft Co. and United Air Lines totaling nearly $2 million.

Pan American World Airways has ordered two units, one DC-8 and one Boeing 707 simulator, from Curtiss-Wright's Electronics Division. PAA has also optioned two more DC-8 and three 707 units.

Douglas' order for a DC-8 electronic "total task" training unit is valued at more than $1,000,000 and calls for delivery before the first Douglas jet is due to fly early in 1958.

United Air Lines' v.p. flight operations, D. R. Petty, announcing the UAL contract with Link, said its DC-8 simulator will cost about $800,000.

WAL Orders 9 Electras; Delta Buys 8 DC-8s

Western Air Lines has ordered nine Lockheed Electra turboprop transports costing $19 million with spares, and has increased its order for DC-6Bs from 13 to 17. First Electra deliveries are scheduled for late 1959, with the full fleet in service by spring of 1960.

Delta Air Lines has increased its order for Douglas DC-8 jet transports from six to eight and has entered a new $30-million bank credit agreement with 25 banks in cities on its system.

GE Reveals Details Of T58 Free Turbine

The turbine engine moved into a new area of operating efficiency as a helicopter powerplant last week as General Electric Co. disclosed details of its T58 free turbine engine being developed for the Navy Bureau of Aeronautics.

The T58, according to G.E. project manager H. T. Hokanson, produces 1,024 shaft horsepower at military rating yet weighs only 325 pounds for a power-to-weight ratio of better than 3-to-1. He compared this to one horsepower per pound of engine weight delivered by piston engines now used in helicopters.

Addressing the 12th annual forum of the American Helicopter Society in Washington, D.C., the G.E. engineer pegged the T58's specific fuel consumption at 0.69 lbs. per horsepower per hour at normal rating. Other T58 specifications disclosed were:

Weight	250	lbs.
Reduction Gear ..	75	lbs.
Specific Weight ...	0.24	lb./hp.
Overall length	59	in.
Diameter	16	in.

Hokanson disclosed that the T58 will soon undergo tiedown and flight tests in a twin-engine Sikorsky S-58 testbed.

House Group Approves $15 Million in Subsidies

The House Appropriations Committee has approved $15 million in new airline subsidy monies for fiscal 1957. The figure is $5 million less than requested by the Civil Aeronautics Board. Total subsidy bill for the year is around $47 million, but a $14.4 million carryover, plus other considerations, reduced actual need in new money to $20 million.

Slick Airways Names R. J. Smith President

Former local service airline president Robert J. Smith has been named president, general manager and a director of Slick Airways. He succeeds Delos W. Rentzel, who will continue as chairman of Slick's board of directors.

Smith assumed his duties as general manager of Slick May 1. He was head of Pioneer Air Lines prior to sale of that company's local service routes to Continental Air Lines and still heads the corporation which survived after that merger. He is also a CAL director and heads Pioneer Aeronautical Services, Inc. CAB approval of the various relationships has been requested.

News Briefs

MANUFACTURING-MILITARY

• **American Machine & Foundry Co.** received an $11 million subcontract from RCA to produce guided missile launching systems. AMF, which has a $58 million defense backlog, is taking over this month the 200,000-sq. ft. USAF facility at Rochester, N. Y.

• **Prof. Courtland D. Perkins,** chairman of Princeton University's aeronautical engineering department, will become the USAF's chief scientist this summer when Dr. H. Guyford Stever returns to Massachusetts Institute of Technology.

• **Irving Pinkel,** of NACA's Lewis Flight Propulsion Laboratory, Cleveland, received the first Laura Taber Barbour Air Safety Award from Flight Safety Foundation, for development of a system to suppress crash fires. Associated with Pinkel in the project were D. O. Black, G. J. Pesman and G. M. Preston.

• **Air Materiel Command** will sell as surplus 220 cargo and trainer planes. First sale involves 25 C-45s, 25 T-11s and 15 T-7s. Bids will be opened May 14 at Hill AFB, Ogden, Utah, where planes are located.

• **McDonnell Aircraft** and the Navy started evaluation tests on a missile-carrying version of the F3H-2M Demon carrier fighter.

• **Fairchild Engine Division's** J44, 1,000-pound-thrust turbojet, has been granted a CAA-type certificate. Company has produced more than 560 of the engines since development started in 1947.

TRANSPORT

• **Northeast Airlines** is negotiating for purchase of five jet transports, the order being contingent upon NEA being awarded extension of its route to Florida. Deliveries would be expected in 1959; expenditure of $25 million would be involved.

• **Continental Air Lines** will build a $2.5 million overhaul and maintenance base for turbine engines at Los Angeles International Airport. First phase, costing $1,250,000, will be completed in March or April, 1957.

• **Scandinavian Airlines System** starts service to Moscow May 9, four flights a week with Scandia aircraft. Two flights will originate in Copenhagen, one in Stockholm, one in Oslo. All flights will make a refueling stop at Riga.

• **John J. Casey, Jr.** resigns June 1 as assistant v.p.-maintenance of American Airlines to join the staff of New York aviation consultant R. Dixon Speas.

• **John A. Collings,** executive vice president of TWA, will continue to serve as chief executive officer of the company pending election of a president to succeed the late R. S. Damon, board chairman, Warren Lee Pierson announced at conclusion of TWA's annual stockholders meeting.

Women Pilots Ask Stamp Honoring Amelia Earhart

The Ninety-Nines, organization of women pilots, have petitioned Post Office Dept. to issue a commemorative stamp in honor of the late Amelia Earhart. They have asked those interested in assisting the move to send endorsements to Postmaster General Arthur E. Summerfield, Post Office Dept., Washington 25, D. C.

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Letters

Editorial Wins Accolades:

'Constructive, Practical, Full of Commonsense'

EDITOR'S NOTE: Copies of the April 9 editorial which received so much reader response were sent with covering letters to the heads of the three major automobile companies.

Included here are replies from General Motors and Chrysler. At deadline Ford had not been heard from.

To the Editor:

I find very interesting your editorial of April 9 representing your views with respect to automobiles in use by the United States personnel in Soviet Russia.

I do not know whether it would be possible to accomplish the objective which you set forth. I am, however, pleased to learn that the present Ambassador to Russia is returning to his post with a 1956 Cadillac. This represents a step in the direction that might very well be followed by other replacements of the old models currently making up the automobile inventory in use by our personnel.

Many thanks for your interest.

HARLOW CURTICE
President
General Motors Corporation
Detroit, Mich.

To the Editor:

I have carefully noted your comments with reference to the people of Russia admiring our products. Naturally, we cannot help but feel complimented, yet the writer can fully understand how these people, who are deprived from receiving news and facts of the world outside of Russia, can be thrilled when they see something that is developed and produced through free enterprise.

Your suggestion regarding the automobile industry making an enormous contribution by seeing to it that there are at least one each of every new model in Moscow is very interesting, but how could it be done unless we were to present diplomatic people and government employees with automobiles, and I don't believe that our stockholders would approve of such transactions.

The United States Government has a definite policy regarding the replacement of embassy automobiles. First, they limit the amount of money that can be spent for a car for embassy use and replacements are made strictly on a combined mileage and age basis. I have the opportunity of visiting many different countries of the world and I find that our embassies use over-aged automobiles in the majority of instances, but, of course, I cannot blame our State Department for wanting to hold down expenditures of this kind, even though automobiles of current models would be very attractive and appreciated by both the people driving them and the public at large.

Undoubtedly, we are going to have to convince the top brass in Russia what it means to have free enterprise, as the control over the public at large is so strong that it is very hard to penetrate.

C. B. THOMAS
President
Export Division
Chrysler Corporation
Detroit.

To the Editor:

Your editorial of April 9 on a bird's eye comment of Russia Vs. the U.S.A. is one of the most interesting, and I think factual personal comments I have read concerning these two countries.

ARCH WERNER
Army Times Publishing Company
San Francisco, Calif.

Having read your April 9 editorial, I hereby nominate you for Secretary of State.

WILLIAM K. EBEL
Vice President, engineering
Canadair, Limited
Montreal, Canada

(Editor's Note: No thanks, I can't live that long.)

Your editorial, "It's the Season for Going Off Rockers," is the best yet! It is so practical, and makes so much sense, that I am sure it will be understood by everybody except General Motors.

G. T. BAKER, President
NATIONAL AIRLINES
Miami, Fla.

Your editorial " . . . Off Rockers." Terrific!
Keep it up—it might penetrate!

JOHN W. MYERS
Pacific Airmotive Corp.
Burbank, Calif.

That editorial in the April 9 issue was a dandy.

C. E. WOOLMAN
President
Delta Air Lines
Atlanta, Ga.

A thousand "amens" to your editorial in April 9 issue! You've said succinctly and with telling directness what I've fumbled through in answering various writers who have asked us about the Russian job. Many of them apparently thought we would close shop and take for the woods.

Your editorial was a swell job.

CARL M. CLEVELAND
Boeing Airplane Co.
Seattle, Wash.

Congratulations on "Season for Going Off Rockers." Knowing nothing about the matter myself but having complete confidence in your own common sense, I think it makes a lot of sense.

CHARLES E. BEARD
President,
Braniff International Airways
Dallas, Tex.

Letters

To the Editor:

We think your editorial "It's the Season for Going Off Rockers" (April 9) is very good and are considering reprinting it in our company publication, *The Flying A.*

MELVIN D. BARKER
Editor, *The Flying A*
Aeroquip Corp.
Jackson, Michigan

To the Editor:

I have just read your editorial in the April 9 issue of AMERICAN AVIATION and want to drop you a note and tell you I think you are exactly on the right track.

Frankly I have never understood why we sit around hiding from the Russians or anyone else the way we have been doing these past few years; and I am glad that someone has come out and started talking like an American again.

S. L. SHANNON
Senior Vice President
EASTERN AIR LINES
Miami 48, Fla.

To the Editor:

Re your editorial April 9: Amen, many times over.

ROBERT H. WOOD
McDonnell Aircraft Corp.
St. Louis, Mo.

To the Editor:

I was born in Glasgow, Scotland, and have been connected either directly or indirectly with aviation since 1915, which certainly makes me somewhat of an old-timer. Having been in this country since 1921 I have seen the amazing growth of aviation in this country and at the same time have been aware of the contributions that Britain has made during the last decade even although such developments were only possible by American-supplied capital.

Like you, I was amazed and disgusted with the furor and hysteria that seemed to permeate the publishing personnel of aviation after the arrival in London of the TU-104 Russian alleged transport. However, I think by now the boys who went overboard all of a sudden are feeling rather sheepish and would like to retract many of their original statements if such retraction were possible.

Forgetting aviation for the minute, your suggestion of selling America to Russia via the medium of our modern automobiles is an excellent idea, and I am hopeful that some of the boys in the State Department will pick up where you left off and see that our representatives in Russia are equipped with up-to-date and colorful ground transportation. I am sure the arrival of such automobiles, if delivered in the manner in which you outlined, would do a better selling job for our country than is presently being done.

More power to you and keep up the good work.

SAM J. IRVINE
Chairman of the Board
Aero Supply Manufacturing Co., Inc.
Corry, Pa.

To the Editor:

I have just read with much interest your editorial "It's the Season for Going Off Rockers," and was very favorably impressed with the suggestion about new American cars in Moscow. I agree with this point of view one hundred percent. Let's give the Russians something they can see.

Incidentally, I took the liberty of mailing this article to my congressman for his consideration.

D. K. HESTER
Atlanta, Ga.

To the Editor:

I have read with a great deal more than ordinary interest your editorial in the April 9 issue on the subject of our relations with Russia. In my opinion what you have to say makes a great deal of sense, and I hope that this page will be read in high places around Washington.

I was utterly amazed by your statement to the effect that our diplomatic corps is not supplied with the latest automotive vehicles. Words may be suspected, but things do not lie. They are a universal language which all can understand. Your idea is a brilliant one, and I hope you succeed in putting it across.

Many of us are enjoying your splendid accounts of your trip through Russia. I have been an avid reader of much that has been published concerning Russia ever since the war, but I have found your series to be by far the most interesting in that you have revealed the human touch and talk about the little things that bring about a better understanding of these enigmatic people.

A. E. HARNSBERGER
General Manager
Transportation and Supply
The Pure Oil Company
Chicago, Ill.

To the Editor:

I wish to congratulate you on your Editorial in the April 9 issue of AMERICAN AVIATION. It is exactly in line with my feelings in the whole matter of Russian achievements. I went to college in Zurich and I am a born Hollander (now a U.S. citizen) and I have some knowledge of the Russian temperament.

I have long had the feeling that what we have seen and heard of Russian achievements is merely the cream on top of the bottle and the cream is neither very rich nor does it extend far down into the bottle.

I frequently watch our first shift going home at 3:30 p.m., probably some 12,000 men and women, and these "unhappy slaves of Wall Street" are driving brand new shiny cars and most of them are joking and laughing. Why don't we invite some of the Russian labor chiefs and newspaper men over here and show them this sight, repeated in all cities all over our land.

"And America is afraid of Russia!!"

A. J. KAPTEYN
Airlines Engineering
Pratt & Whitney Aircraft Engines
East Hartford 8, Conn.

To the Editor:

Just a note to say I thought your editorial "It's the Season for Going Off Rockers" made a tremendous amount of sense.

JOHN A. CREEDY
Director of Public Relations
Pan American World Airways System
New York, N. Y.

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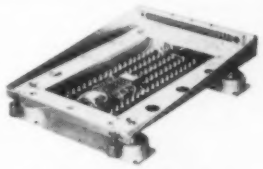

for Navigation Receiver
MT-273E/ARN-6
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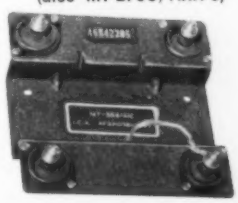
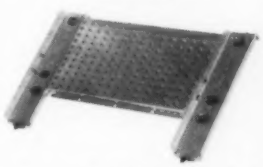


for Intercommunications System
MT-556A/A1C



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USAF HAS ENTERED THE JET/TURBOPROP ERA. All 1898 planes to be ordered with fiscal 1957 money will be powered by gas turbine engines. Piston-powered aircraft ordered in previous years will, of course, be in the inventory for years to come. Also, acceptances of jet and turboprop engines are increasing. In 1955, 77% of all powerplants purchased were gas turbines averaging 8,800 pounds thrust. The figure was 67% a year earlier.

●

LEAD-TIME HAS DROPPED from 20 to 18 months for the average USAF plane during the past year. Result: defense officials were able to defer financing of 314 planes. But the drop in lead-time is only a one-time saving. USAF will have to finance a full 12 months of production in fiscal 1958 compared with 10 months in 1957.

●

$110 MILLION WILL BE THE COST of 1956 labor contract negotiations in west coast aircraft industry. This includes wage increases, strengthened pension provisions, other benefits. Unions made noteworthy gains. Industry had expected 4% wage boost, but it averages 5%. Companies gained, however, by getting two-year contracts. This fixes next year's pay increase at 7¢ an hour, compared with an average of 11¢ this year. It also virtually insures no production interruptions.

●

SPENDING FOR GUIDED MISSILES is climbing steadily. In fiscal 1952, only 4% of USAF's appropriation for aircraft and related procurement was for missiles. In 1956, it's 12%, and climbs to 20.3% in 1957. By 1959, it will be 35%.

●

INITIAL SPARE PARTS FOR NEW PLANES are taking less military procurement money. USAF, for example, spent 44.2% of its funds for spares in 1951. But the figure has been cut to 25% in fiscal year 1957. Reason: longer service life of engines and components. Example: General Electric J47-25 used in B-47 may now be operated 1,700 hours between major overhauls.

●

SWITCH TO STAINLESS STEEL in fighter and bomber airframe construction may result in aircraft industry taking 5% of total U.S. production. A new fighter, for example, will require 70-75% steel in the various grades and forms, contrasted to previous usage of 15-20%. Maj. Gen. David Baker, Air Materiel Command's procurement and production director, notes that requirement could reach 35,000 tons a year based on current levels of aircraft production through 1960.

●

ENGINEERING OPENINGS ARE AT RECORD HIGH in the aircraft industry. Estimates are that on the west coast, for example, companies are spending $3 million a year on newspaper advertising, mostly for engineers. Almost every manufacturer could use from 100 to 600 more.

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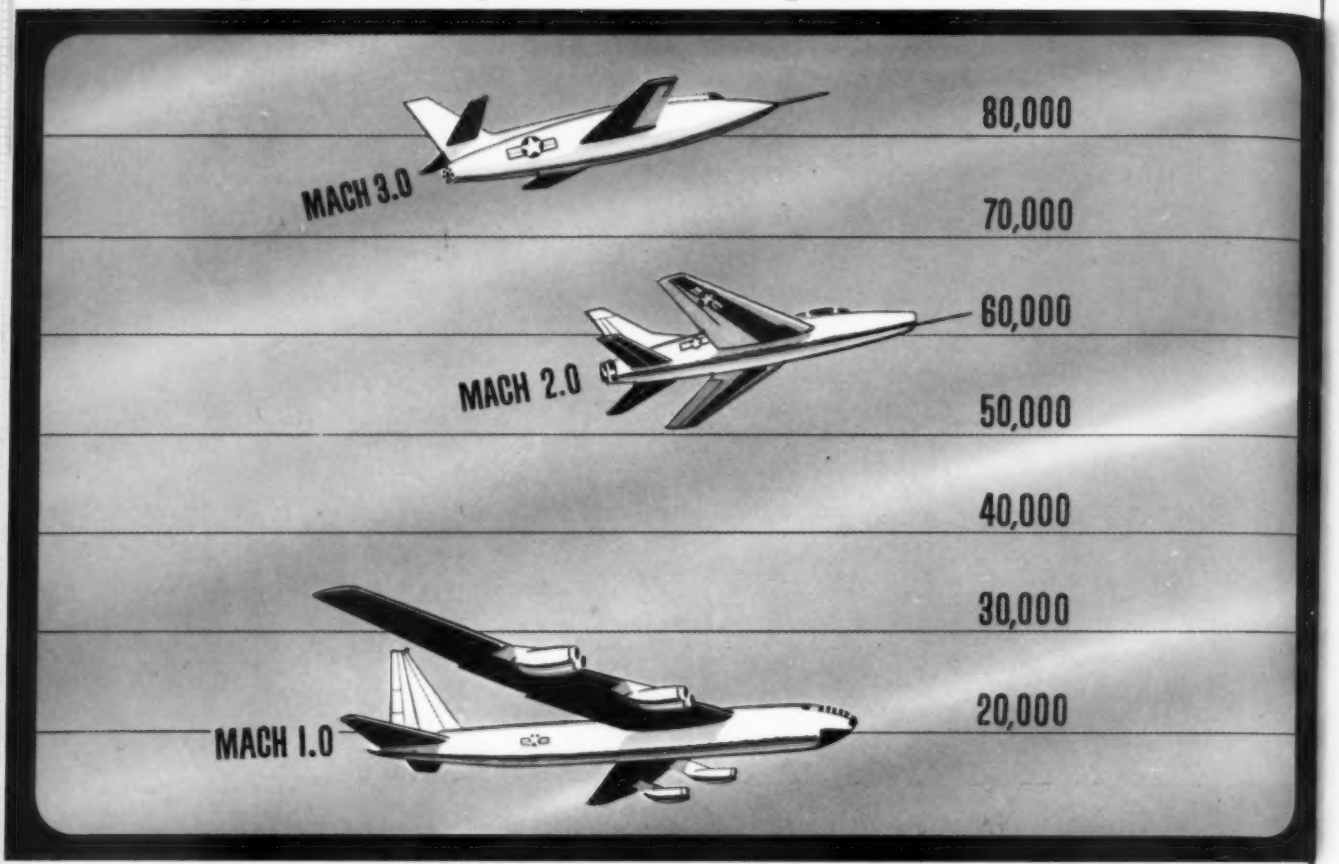

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Circle No. 7 on Reader Service Card.

Production Spotlight

• Test program for the Rolls-Royce RB 109 Tyne has been little affected by a recent incident at Derby—a propeller blade broke on one of the engines under test and badly damagd the test bed.

• Prospects for installation of the Rolls-Royce Conway in the Handley Page Victor are improving. Military experience would help to sell the by-pass to commercial customers.

• De Havilland Canada's original Royal Canadian Navy order for 25 license-built Grumman S2Fs has been increased to 100 aircraft. First is expected to roll off the Toronto company's line in June.

• Two French engine firms, Hispano Suiza and Turbomeca, have formed a joint company for R&D work—Societé Generale de Turbo-Machines.

• Navaho air-breathing intercontinental missile has had its designation changed from SM-64 to SM-104A. North American Aviation has just received a $5,325,000 facilities contract for the SM-104A missile system. Meanwhile, tests on the Navaho are continuing at Patrick AFB, Fla.

• McDonnell's F-101B Voodoo interceptor, now under development for the Air Defense Command, will be a two-seater. F-101A long-range fighter for Strategic Air Command, which will carry only the pilot, has been subordinated to the "B" in AF plans.

• Studebaker-Packard Corp. and its Los Angeles subsidiary, Aerophysics Development Corp., are negotiating with Army Ordnance for a large contract for a surface-to-surface missile. Aerophysics has also produced a hypersonic (Mach 5 or better) test vehicle for the Air Force as a free-flight research tool. The L.A. research company is headed by Dr. William Bollay, one of the prime developers of the Navaho before he left North American Aviation in 1951.

• Navy has asked Frye Corp. to come up with a proposal on its F-1 "Safari" transport using four Lycoming T53 free turbines as powerplants.

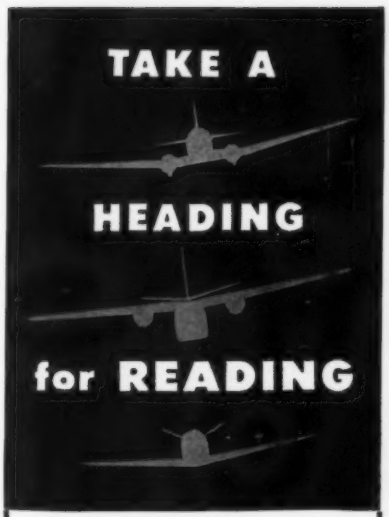
• Allison's J71 jet engine has been exonerated as a potential cause of the Martin XP6M crash in the Chesapeake Bay last December. Navy accident investigation board is now writing its report of findings which may place blame in as many as three other areas. J71 is still slated for six "Y" versions of SeaMaster in addition to the other "X" model. Production airplane will have Pratt & Whitney J75s.

• Boeing Airplane Co. has logged more than 250 starts on its 707 jet prototype with a Hamilton Standard-developed FAS 700-4 fuel-air combustion starter which it has operated since last August. Unit uses compressed-air in combination with JP-4 fuel from airplane system to "fire" a small turbine, the shaft of which is geared down to crank the J57 engine. Average start time is said to be less than 20 seconds.

• AF's three major aircraft competitions have been given designations as weapons systems. Fighter-bomber (North American and Republic) is now the WS-300A, long-range interceptor (Northrop and NAA) is the WS-202A and the tactical bomber (Douglas and Martin) is the WS-302A.

• Convair has dropped out of the AF's WS-110A competition for a chemically fueled bomber. Design calls for a 10,000-mile-range aircraft flying at 70,000 feet and capable of Mach 2 over the target. Companies still working on the project are Boeing and North American.

• Although virtually every airframe and engine company did research on a nuclear-powered bomber for the AF, the WS-125A competition has been narrowed to Lockheed and Convair, which are respectively coupled with Pratt & Whitney and General Electric.



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VOL. 19, NO. 25

Is Air Force Dictating to Industry?

AIA charges socialization trend; Sharp and Quarles say no, aim is to correct abuses rather than control management policy.

By ROBERT M. LOEBELSON

A SOLUTION to most of the problems to which the Aircraft Industries Association is currently objecting has been promised by the Air Force by the time the AIA board of governors holds its annual meeting at Williamsburg, Va., May 23-25.

AIA's present unhappiness with the Air Force stems from two Procurement Circulars (No. 1 and No. 10) which, the industry feels, tend toward "socialization" and are "not to the advantage of the United States."

• **In the opinion** of a large segment of the industry, the AF's actions will usurp many of management's prerogatives. As they are now written, Procurement Circulars 1 and 10 provide that:

• Any management salaries over $25,000 or increases beyond that level must be specifically approved by the administrative contracting officer with authorization from the Air Materiel Command. However, no AMC approval is required if the contracting officer decided to turn down the pay of an executive over $25,000.

• All company salaries beyond $15,000 will be examined on an individual basis to determine whether that amount of compensation is unreasonable.

• All applications for incentive or per diem pay must be carefully screened and are to be granted "only where justified by all the circumstances and in such amounts as may be the minimum necessary for obtaining qualified, professional or specially skilled personnel."

• When submitting proposals, companies must submit a list of proposed subcontractors.

• **The Air Force** has specifically told the industry it has no intention of retreating in any way from the last point, claiming that it must have the list of proposed subcontractors so that the broad mobilization base program can be continued and so that subcontractors who have proved unreliable in the past can be deleted. AIA counters, however, that supplying such a list in advance eliminates the possibility of creating competition (and therefore a better product and price) by coupling them with the subcontractors in advance.

USAF officials claim the new procurement circulars do not do anything more than consolidate a number of powers which the service has had all along, pinpointing them for the benefit of administrative contracting officers. On the review of executive salaries, for example, it is claimed the AF is only trying to avoid excessive pay boosts.

AF Doesn't Seek Control

• **In the words of** Dudley C. Sharp, Assistant Air Secretary for Materiel, "It is certainly not our purpose to control the internal management of individual companies who produce primarily for the Government, but on the other hand we cannot ignore, for example, sudden salary increases which are obviously out of line."

One other important issue over which the AIA and the USAF find themselves in disagreement is a proposed "control of production" clause which the AF wants to stick in existing and future contracts with airframe and guided missile companies.

As originally written (and violently objected to in a letter sent last December by AIA president DeWitt C. Ramsey to Air Secretary Donald A. Quarles), contractors were told to supply the AF with all the information they use in planning for mass-production and were informed that they were to order no more from subcontractors than the amount called for in the prime contract.

(This was a USAF effort to reduce termination charges if the prime product should be cut back or cancelled or another component substituted. In the past, Congress has tended to blame the AF for permitting overbuying by prime producers.)

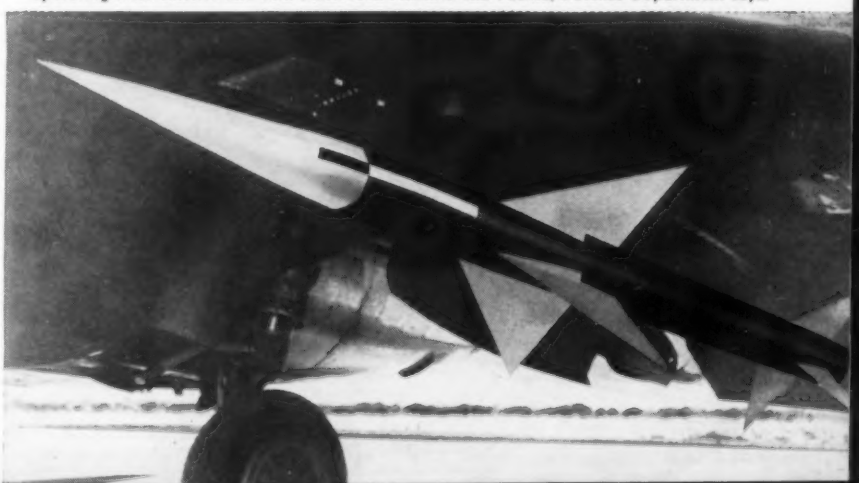
• **As it stands now,** however, the AF has revised its control of production clause into three simple paragraphs, which, AF officials believe, will cause no screams from industry. In essence the clause now reads:

• To the extent deemed feasible, contractors will not purchase more equipment and materials than they need to maintain the production schedule.

• Within 90 days after the contract becomes effective, contractors will supply the AF with the information management uses in putting a plane or missile into production. Included would be such items as manpower hiring plans, proposed subcontractors, engineering and production releases, and pro-

Navy Unveils Sperry Sparrow Missile

Navy's supersonic Sparrow I air-to-air guided missile, powered by an Aerojet-General solid-propellent rocket, has become operational. Jet fighters armed with the Sperry missile are operating from carriers and with Marines in Atlantic and Pacific, Defense Department says.



grammed purchases of special tooling and materials.

• Unless the AF decrees them unnecessary, quarterly reports on the same subject matter must be submitted.

• **All the issues** were the subject of an hours-long discussion between a group of industry executives and four top USAF officials, including Quarles, Sharp, Maj. Gen. Thomas P. Gerrity, Assistant for Production Programming in the Office of the Deputy Chief of Staff for Materiel, and Max Golden, Sharp's deputy for procurement and production.

Cites Obligation to Congress

Quarles told the AIA representatives at the Pentagon meeting that the Air Force wants to remain strictly a procuring agency and had no desire to take over internal management of the companies. However, he added, the Air Force does have an obligation to Congress and the American people to make certain its procurement funds are not spent unwisely.

AIA, which had been promised that virtually all of the problems would be resolved in time for the Williamsburg meeting later this month, left the meeting reassured and even partially optimistic. Sharp subsequently told AMERICAN AVIATION that the AF has no objection to changing some of the wording in the procurement circulars as long as it will be able to obtain the information it feels is necessary.

Attending the Pentagon session for AIA were C. W. LaPierre, executive vice president of General Electric and chairman of the AIA board of governors; DeWitt C. Ramsey, AIA president; Mundy I. Peale, Republic's president; Harold M. Horner, United Aircraft's president; Richard S. Boutelle, president of Fairchild; Whitley C. Collins, Northrop's president; Malcolm P. Ferguson, Bendix president; C. J. McCarthy, chairman of Chance Vought; and E. B. Newill, GM vice president and general manager of Allison.

Also present were Courtland S. Gross, executive vice president for Lockheed; Richard M. Mock, president of Lear; William C. Whitehead, president of Garrett Corp.; Dwane L. Wallace, president of Cessna; John P. Gaty, vice president and general manager for Beech; J. V. Miccio, vice president and general manager of Wright Aeronautical; Frank W. Miles, Garrett's vice president for Eastern operations; C. G. Holschuh, vice president and general manager for Sperry Gyroscope; David Wright of Thompson Products; Herbert Fletcher of Fletcher Aviation; and Lawrence E. Williams, Washington representative for Vertol Aircraft. ◆◆◆

Symington's Air Power Investigation Gets Underway Slowly—No Sensations

By FRANCIS J. KEENAN

Three views of Sen. Stuart Symington's airpower investigation were competing for acceptance last week:

(1) That it had already fallen flat, due either to a failure to exploit its ammunition or to public indifference to issues of national defense.

(2) That Symington was pacing himself deliberately, reserving explosive material for later, more strategic moments in his lengthy hearing.

(3) That the former AF Secretary was simply going about the business of building a solid framework for estimating the relative strength of U.S.-Soviet airpower—without manufacturing sensationalism.

While exponents of all these views could offer some supporting evidence, it was too early to tell just what significance the Symington inquiry would have on the future of American airpower—or, as many observers insisted, on the Senator's own political future as a dark-horse Presidential possibility.

Two facts were obvious, however. The hearings would offer a handy device for exploiting outside developments, and would provide so broad an agenda as to render all that flies grist for its mill.

• **Nikita Khrushchev,** boss of the Soviet Communist Party, gave the Symington study a boost with his boast that the USSR would soon have an intercontinental missile equipped with a hydrogen warhead. CIA Director Allen Dulles, testifying at the time in secret session, seemed to consider the claim an exaggeration. But others in Washington, especially members of the opposition party, were vocal in pointing to the claim as a warning of further Soviet advances.

• **Sen. Henry Jackson** (D-Wash.), a subcommittee member and among the most persistent critics of Administration defense policy, insisted the Khrushchev announcement must be considered true. And, he added, the CPSU chief undoubtedly referred to a ballistic missile rather than a guided missile.

Democratic Presidential aspirant Adlai Stevenson also seized on the Khrushchev threat to demand a speed-up of the U.S. ICBM project. He said the Eisenhower Administration has been "dangerously dilatory" in this field.

Symington Holds Fire

But Symington himself was holding his tongue. In doing so, he was following the path of silence he set as soon as the Senate Armed Services Committee approved his special investigation earlier this year. He and his associates explained that the Missouri Democrat had been seeking such an inquiry for more than a year and now that he had it he was not going to risk its effectiveness through partisanship.

Nevertheless, it was clear at week's end that Symington might not have the final word. The combination of a hot presidential campaign and the hostile spirit brewed by the Russian threat and the Khrushchev-Bulganin visit to Britain was forcing the issue of U.S. preparedness farther up front on the national consciousness than it had been since the end of the Korean War.

• Reporters made the question of primary concern at the President's press conference, where the Chief Executive again insisted that appropriations alone were not sufficient to speed up the missile program. He indicated the U.S. program was moving close to a "maximum effort." And he estimated that it approximated the level of soviet activity.

• Sen. Joe McCarthy got into the act, joining in Democratic demands that the program be placed on a "crash" basis in order to "catch up" with the Russians. McCarthy also urged a joint congressional investigation of U.S. missile programs.

• Both the President and Sen. McCarthy criticized Adlai Stevenson's proposal that the U.S. unilaterally abandon its H-bomb tests. Eisenhower took the position that the tests, scheduled for the Pacific this month, were inevitably tied to progress in guided missiles.

Gen. LeMay Testifies

Meanwhile, Sen. Symington moved into the area of active military leadership for witnesses. Amid Pentagon reports that he would carry his demand for more B-52s to the subcommittee, Strategic Air Commander Gen. Curtis LeMay testified during two days of secret sessions.

LeMay, though he refused comment on the issues, indicated what may turn out to be a chief frustration for Symington. In response to questions whether he was "completely satisfied" with the AF budget, LeMay replied that no commander is ever entirely satisfied. But, he added in a significant comment, after he makes recommendations on his military requirements and after civilian chiefs have completed a final budget based partially on additional political and economical considerations, it is the

military commander's duty to carry it out.

• **It is no secret** that military men would like more planes, more operations and maintenance money, and more research and development funds. But just how far men like Gen. LeMay, and Gen. Thomas Power, Air Force R & D chief, will go—even in Symington's secret sessions—is another matter.

The political and legislative success of the Symington inquiry will depend on how fully and frankly these and other military leaders testify.

This fact became especially clear after the first week of hearings. Even former military commanders of the stature of Gen. Carl Spaatz, Gen. Omar Bradley, Gen. Walter B. Smith and Adm. Robert Carney could not, apparently, command the enthusiastic response necessary to a successful investigation.

• **All four witnesses** emphasized that airpower depends on immediately available strength and the continuous research effort to assure future strength. But none had the vitally important current information, the facts and figures behind today's Pentagon decisions, needed to create the sense of immediacy and authority for their positions.

Symington has about two months to make his record, to back up his earlier charges that budget-minded Republicans were threatening U.S. sufficiency in the air. And he has organized his hearings into four phases, designed to develop every real possibility.

These will be, he said:

(1) "witnesses eminently qualified to testify as to developments in the military situation since the end of World War II."

(2) "an examination of the present and prospective airpower of the Communists . . ."

(3) "testimony about the present and prospective position of U.S. airpower with respect to all major elements which affect that power."

(4) "an appraisal of the capability of our Air Force to discharge its mission in the light of what is known about the strength of the Communists."

◈ ◈ ◈

Curtis Tells Airport Operators His Job is to Provide Guidance

PHILADELPHIA — Edward P. Curtis, President Eisenhower's special assistant for aviation facilities planning, doesn't intend to "take over" the day-to-day airport problems of existing civil and military agencies.

In his first public address since taking office, he told an annual meeting of the Airport Operators Council here that it is no part of his job to decide what airport should serve Detroit, or for that matter, where a second airport for Washington, D. C. should be located. Curtis was introduced by Wayne W. Parrish, editor and publisher of AMERICAN AVIATION, who acted as toastmaster.

Curtis emphasized that two features distinguish his operation from that of government agencies faced with such problems. These are the "timing" of his activities and the clear-cut responsibility and authority to make decisions.

On the matter of timing, instead of solving today's issues, Curtis said it is his job to come up with a plan that will give airport people some reasonably specific guidance that will aid them in their forward planning.

• **Future airport development,** he declared, must be planned as an integral part of any aviation facilities system. Modern aviation is so complex and facilities so expensive, he has found, that the U.S. can no longer wait "until the aircraft is more or less on final approach before we begin adjusting our airport facilities."

Another important difference over operating agencies as far as developing a plan is concerned, Curtis pointed out, is that his office has the clear responsibility and authority to make decisions without final reference to a committee-type organization, where it is "always difficult to get a clear decision."

He added, however, that he would not "operate in a vacuum" and that views of all industry parties would be considered. If and when reasonable agreement on a plan is reached, he emphasized, the mechanism will exist to approve it.

• **His first step,** Curtis revealed, will be to accelerate a comprehensive up-to-date requirements study of long-term aviation facilities. A staff-prepared specifications outline of such a study has been completed and he now proposes to put the responsibility for making the study itself into the hands of the "most capable organization or group of organizations we can find familiar with modern forecasting techniques and operations research methods."

The study group will make the fullest use of personnel and organizations within the government and among practical operating people, he promised.

He assured the airport operators that while they might "perhaps feel that we are considering primarily the traffic control and communications aspects" that actually "both requirements study and the engineering phase will focus on your airport problems as well."

Navy Introduces Its Newest Grumman Cougar

Navy has ordered more than 100 of the new Grumman F9F-8T Cougar fighter-trainers. Aircraft will be used both as operational fighters and jet trainers. First photo of new jet was released this month. Powerplant is a Pratt & Whitney Aircraft J48.

How Good is Russia's Jet Transport?

***The recent flight to London of Russia's Tupolev Tu-104 jet transport has touched off some sharply conflicting reports as to its merits. Here* AMERICAN AVIATION *reports on the latest of these appraisals, that of a team of top British airline officials in a confidential report following an extensive tour of the Tu-104 during its London stay. For earlier coverage on the Russian jet, see "Personal View," publisher Wayne W. Parrish's editorial, and James Hay Stevens' technical article, both in the April 9 issue of* AMERICAN AVIATION.**

The already conflicting "technical" opinions on the merits of Russia's Tu-104 jet transport have taken on a strange new aspect following an inside-out appraisal by a group of top British airline officials during its recent London visit.

In sharp contrast with an earlier "debunking" of the Tu-104 by Britain's Peter Masefield as perhaps a good Russian product but not a very good airplane, a confidential report by this airline team poses it as a formidable threat to U.S. and British transport design leadership.

• **Particularly impressive,** AMERICAN AVIATION learns, was the Tu-104's two Mikulin M.109 jet engines. They classed these as production powerplants of significantly greater output than any engine in a comparable state of development outside the Iron Curtain.

And based on an assumption that the Russians will proceed with a larger model using four M.109s, they hint that the Soviets might produce (before the U.S.) an airplane in the same class as the Douglas DC-8 and Boeing 707.

Russian Intentions Reappraised

In any event, this segment of British technical opinion was convinced that the Tu-104 stands as irrefutable evidence that the Russians intend to compete seriously in the output of advanced transport aircraft. Even granting that this particular design may have only short-term use and may not offer any real competition, these officials were sold on the idea that the Soviets are a force to be reckoned with in the civil as well as the military field.

But what is virtually beyond a reasonable explanation is their diametrically opposite report on the workmanship in the Tu-104 to that of Masefield, who is generally accepted as one of Britain's top technical and administrative aviation authorities. Whereas he found the riveting job one that "wouldn't pass muster" in British shipyards, they report the general standard of riveting and external finish as quite outstanding.

And except for some additional data on the Russian engines, details learned in Tu-104 inspection agree with those formerly reported (AMERICAN AVIATION, Apr. 9). They estimated the engine nacelles to be about six feet in diameter, and that the diameter of the jet nozzles is such that if operated

Dual nose-wheel design follows German practice of locating shock strut forward of axle. Mating point of bomber nose to transport fuselage shows as seam just behind door.

Front view shows plastic "chin" radome immediately below nose navigators positions.

Tu-104 empennage appears identical to that of Badger bomber with 45° sweepback to fin and stabilizer.

"choked" at full power, the M.109's static thrust would be in the 18,000-pound range.

As to cabin pressurization, the pilot of the Russian jet placed its cabin altitude at about 6,500 ft. when operating at 33,000 ft., somewhat better than the 9,000-ft. level attributed to it by the Moscow press. The inspecting team also noted the Tu-104s "VIP" interior for 50 passengers, fitted with fully-adjustable, four-abreast seats at a pitch of about 42 inches in line with the windows. Circular porthole windows were estimated at 15 in. in diameter.

• **One novel feature** observed in the cabin was the Russian approach to "air-conditioning" in the Tu-104. In addition to the usual oxygen outlets at each seat position, a hose-and-nozzle device was provided at each passenger location for spraying cold air on the face.

General interior furnishing was considered good but typically Russian in style. This included much dull coloring, heavy materials, polished dark woodwork, artificial flowers in vases and elaborate decorations.

One significant factor overlooked in the Tu-104's development is that the postwar success of its designers (the Tupolev team) ironically began with a "carbon copy" of the Boeing B-29 (Tu-4) and today parallels the bomber and transport activities of Boeing in the U.S.

Leading up to the Tu-104, Tupolev turned from the Tu-4 Bull medium bomber to the Tu-70 Cart, a transport version that never went into production. It stands, however, as the background experience of the Tupolev bomber-to-transport conversion activity which has now developed into the Tu-104.

After the Tu-70, this team developed the Tu-12 Bosun light jet bomber in 1948 and has since produced it for the Russian Navy. Next in line was the Badger medium bomber, from which the Tu-104 was derived. First prototype of the latter was shown at Red Aviation Day ceremonies last July, and the British airline officials were told it is now in limited experimental service on routes inside Russia. Captain of the Tu-104 which flew to London said that particular airplane has logged about 500 hours, only slightly more than that of Boeing's 707 jet prototype.

Parachute Exit

• **One other feature** of the Tu-104 noted by the British team may give some clue as to how the Soviets utilize the prototype versions of the jets. This "VIP" model incorporated a parachute exit in the vestibule of the forward cabin entrance, immediately aft of the flight deck.

This exit was covered by a power-operated hatch permitting it to be opened in flight once the cabin was depressurized and the landing gear lowered. The outlet through the nose wheel well was considered a very effective parachute exit.

Granting that this is obviously a desired feature in a test aircraft, the furnishing and instrumentation of the rest of the airplane did not support the conclusion that the exit was simply a carryover from test stages. Speculation is that it may be intended for special service work, which might involve parachuting of small numbers of men into foreign countries, probably from high altitudes, in bad weather or at night.

Bearing out this theory are a number of other factors in the TU-104 layout. Navigational equipment is extremely elaborate and self-contained and includes radar. The oxygen points located at every seat would allow depressurization at altitude for parachute drops. In addition to these, isolated single chairs in the compartment behind the parachute exit appear quite useful to a parachutist for donning equipment prior to a jump. ◈◈◈

Cabin has VIP layout for 50 passengers, is elaborately decorated with polished dark woodwork. Hose and nozzle device at each seat supplements oxygen, is intended for spraying cold air on the face.

Jet tailpipes are faired into wing-to-fuselage fillet. Large diameter of nacelle does not rule out possible by-pass engine design.

Lockheed Bids for Lead in Jet Fighter Race

F-104A, called world's fastest combat plane, is said to be capable of Mach 2.1 or better; J79 engine, thin wing rated key factors.

By HENRY T. SIMMONS

LOS ANGELES—Lockheed Aircraft Corp. took the center of the aviation stage last month with the unveiling of the "world's fastest combat plane," the droop-winged, Mach 2-plus air superiority fighter, F-104A.

Known as the "Starfighter," the new plane and a companion two-seat F-104B version are presently in quantity production at Lockheed's Burbank, Calif., plant. The aircraft opens a brand new chapter in the company's jet aircraft production, which began more than 10 years ago with the venerable F-80 Shooting Star, the first operational U.S. jet fighter, and has included the F-94, T-33, TV-2 and T2V series of fighters and trainers.

The years since World War II have seen rival manufacturers shoulder their way into the jet fighter limelight with numbers of hot new jets, and Lockheed became one of many in the field. But with the F-104A, the company has entered a solid bid to move far out in front of its competitors in the torrid race for jet fighter business.

Speed: Mach 2.1 or Better

• **Exact details** of the aircraft's performance were not officially disclosed, beyond a Lockheed statement that the F-104A is in the Mach 2 category. Unofficially, however, both Air Force and Lockheed representatives bristled with assertions that the machine can achieve speeds in excess of Mach 2.1.

One highly-placed AF official said the F-104A should be able to beat the recent 1132 mph mark of the British Fairey Delta FD-2 by at least 25%, which would put its speed at 1415 mph or more.

Lockheed said the machine's speed in climb "is equal to its speed in straight-and-level flight." One official said privately the F-104A can exceed the climb rate of the 600-mph F-94 Star fire by a ratio of five-to-one.

Lockheed officials on hand for the Hollywood-type premiere of the new fighter at Palmdale, Calif., hesitated not at all in predicting a bright future for it. C. L. (Kelly) Johnson, Lockheed vice president for research and development, declared the plane has the same flexibility of design as the F-80 and forecast a production life extending as late as 1961.

• **Most striking** physical feature of the F-104A is its unbelievably thin, stubby wings which slant downward with 10 degrees of negative dihedral. The aircraft also has a high T-shaped tail, claimed to be twice as effective as conventional tail designs, and large air inlet ducts designed to maximize ram air pressure at supersonic speeds.

Major considerations in the design of the F-104A, according to Hall L. Hibbard, Lockheed engineering vice president, were the elimination of all possible airframe weight and the attainment of the maximum simplicity of operation to achieve optimum speed and maneuverability.

Long nose, stubby wings are emphasized in the head-on photo of the F-104A.

Johnson said simplicity and relatively small size of the airframe structure means the AF "for a given number of dollars expended . . . can buy about twice as many F-104 airframes as comparable larger fighters." At the same time, he insisted the aircraft is not "stripped," noting that it has safety devices "in practically the same degree as our previous fighters."

• **Weight of the aircraft** was not disclosed, except that it was said to be about one-half that of competitive jet fighters. This would put it in the neighborhood of about 18,000 pounds. Despite a wing loading of about 90 pounds a square foot, however, the F-104A lands at a speed of about 135 knots, compared with 150 knots for the North American F-100 jet fighter.

The F-104A measures 54 feet, 9 inches in length and has a wing span of only 21 feet, 11 inches. Each wing measures 7 feet, 6 inches from fuselage to wingtip. Radius of the leading edges of the wing and tail surfaces is 0.016 inches (about the thickness of the average table knife), while maximum thickness is less than two inches. Height of the aircraft is 13 feet, 6 inches.

J79 Engine Unique

• **A key factor** in the high performance of the Starfighter is the General Electric Co. J79 plus afterburner which powers it. Thrust of the engine was not revealed, although it was said the powerplant produces "more thrust per pound of weight than any other engine in its power class."

The J79 is unique in that it employs variable pitch stator blades in the compressor to give it optimum performance at all altitudes. Thrust of the J79 with augmentation was estimated at about 15,000 pounds, or roughly equal to the larger, heavier Pratt & Whitney J57 used in most of the present Century series of fighters.

The prototype XF-104, which first flew Feb. 28, 1954, is powered by a Curtiss-Wright J65 engine. It is substantially similar in external appearance to the production model except for a slotted air-inlet arrangement not used on the latter.

• **The peculiar configuration** of the F-104A results largely from the requirement that its wings be as thin as possible to attain high Mach numbers, according to Johnson. "There is no airplane flying in the world today, even research airplanes, with a wing as thin

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as that of the F-104," he declared.

A low aspect ratio is mandatory at the speed at which the plane will operate, and this calls for an ultra-thin wing," he explained. But because of the thinness of the wings, they must also be clipped short to avoid problems of flutter and aeroelastic load.

The shortness of the wings in turn requires the negative dihedral. Since the vertical tail fin is about the same length as the wings, deflection of the rudder tends to act like an aileron, producing roll. To compensate for this, he said, the wings were dropped 10 degrees from the horizontal.

• **The wings** of the F-104A are located nearly two-thirds of the way back on the fuselage.

They do not extend through the fuselage as a single structural unit, but are joined separately at mid-fuselage to provide extra space. This position provides greater symmetry and therefore 12% less drag than a low-wing configuration, according to Johnson.

Although essentially straight wings, the leading and trailing edges taper toward the center line with the tips squared off.

Johnson declared the straight-thin wing of the Starfighter "is best for maximum supersonic performance."

Slats Used Instead of Flaps

Instead of flaps, the F-104A employs leading and trailing edge slats to alter the shape of the wings for takeoff and landing. The slat actuator systems are supplied by Electrical Engineering and Manufacturing Corp., Los Angeles, which is winding up work on a contract to manufacture 17 sets of actuators plus spares for the pre-production model. This company also holds a contract to build 228 ship sets of actuators under the accelerated F-104A program.

Other major features of the F-104A:

• A downward firing ejection seat to minimize the danger of the pilot colliding with any part of the aircraft.

• An integrated electronics system consisting of a number of communication and navigation components in separate "packages."

The separate units can be quickly installed "to provide the aircraft with only the electronics equipment needed for a specific mission."

• A horizontal stabilizer designed so that its entire surface moves.

• An auxiliary ram air turbine to power a generator for emergency electrical power in event of a failure of the aircraft's regular power system.

• Jettisonable tip tanks which fit like gloves over the wingtips instead of being attached as completely separate appendages. •••

AMERICAN AVIATION FINANCIAL SURVEY

Aircraft Industry Dividends Are Reasonable

Average payout for industry in 1955 was 34.7% of earnings, as compared with 52% for all American corporations.

By SELIG ALTSCHUL

Dividend policies of the aircraft industry have been accorded special attention in official government circles as one phase of various inquiries. Commenting on this subject recently, a ranking Air Force official noted: "Aircraft dividend policies have to date been reasonable."

The facts amply support the Air Force statement. If anything, cash dividends relative to earnings have been rather low. This is borne out by an exclusive AMERICAN AVIATION compilation showing dividend payouts for the separate aircraft companies during the past four years.

As shown in the accompanying table, the aircraft industry averaged a dividend payout of but 34.7% for 1955. This compared with 52% as paid by all American corporations, according to the Department of Commerce.

In 1954, while the general U.S. corporate dividend payout was 59%, according to the same source, the aircraft industry averaged but 30.3%. Similarly, the average experience for 1953 was 55% and 34.7%, respectively; and for 1952, 56% and 33.5% respectively.

• **Within the aircraft industry,** there are variations among the separate companies. During 1955 the highest cash dividend distributions relative to earnings were made by Bell, Douglas and General Dynamics. Honors for consistent cash payments to stockholders, in relation to earnings, for the four-year period, belong to North American Aviation, United Aircraft and Douglas.

Of course, cash dividends represent but a major end-result of earnings. And it is earnings which will remain the far more important element in any investment consideration or as the measure of health of the aircraft industry, or any other group for that matter.

While earnings for the aircraft group, as a whole, have been at a high level in recent years, cash dividends to stockholders did not keep pace. This same trend is likely to continue in the near future.

• **The reasons** are not hard to find. The industry is faced with a continuing need for augmented capital resources. Expansion requirements for plant, equipment and related facilities are increasing. Tighter policies on progress payments have also led to the need for greater working capital balances. New financing has been undertaken in a few instances in recent years to develop a segment of the required additional capital. It is to retained earnings, however, that the industry has looked for its dominant reliance for additional funds necessary for capital expansion purposes.

It is significant that a tabulation of net worth positions of a group of 19 aircraft companies shows that their net worth positions, in the aggregate, increased some $260.4 million during 1955. It may be presumed these funds, generated entirely by earnings, found their way into expanded facilities for the aircraft industry.

As a supplement to cash distributions to stockholders while serving the need to conserve resources, stock dividends have also been utilized to an increasing extent by the aircraft industry. This is also indicated in the accompanying table.

Stock dividends, for all practical purposes, permit the company to retain cash in the enterprise while appearing to give the stockholders a form of return. Stock dividends, however, tend to convert earnings into permanent capital and require management to earn a return on the reconverted capital.

For the recipient, stock dividends serve to reduce income taxes by translating regular income to capital gains. Certainly, as the enterprise continues to expand and remain profitable, the stockholder may prefer to receive stock, foregoing some current income but instead having equity values augmented.

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AIRCRAFT COMPANY EARNINGS AND DIVIDENDS

Four-Year Period—1952-1955

(Per Common Share)

Company	1952			1953			1954			1955		
	Earnings	Dividends	Percent Dividend Payout	Earnings	Dividends	Percent Dividend Payout	Earnings	Dividends	Percent Dividend Payout	Earnings	Dividends	Percent Dividend Payout
Beech	$2.82	$0.80	28	$3.87[7]	$1.20	..	$5.64	$1.00	18	$4.79	$1.00[5]	20.9[5]
Bell	3.46	1.50	43	3.92	2.00	51	2.85[1]	1.25[1]	44	2.25	1.25	55.6
Boeing	8.67	2.67	31	12.51	3.50	28	11.39	3.00	26	9.33	3.25	34.8
Cessna	1.59	0.50	31	1.54	0.50	33	2.97	0.50	17	2.97	0.75	25.3
Chance Vought	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	6.15	0.80	13	4.41	0.60	36.3
Convair[3]	3.49[2]	1.75	50[2]	4.31[2]	1.80	42[2]	...	...	..	...	...	...
Curtiss-Wright	1.02	0.60	59	1.28	0.60	47	2.35	1.00	43	4.75	1.75	36.8
Douglas	8.99	3.75	42	15.46	6.50	42	14.70	6.50	44	7.65	4.00	52.3
Fairchild	1.36	0.60	44	1.74	0.80	46	1.43	0.80	56	1.41	0.55[5]	39.0[5]
General Dynamics[3]	....	....	..	.....	...	..	9.44	3.50	37	4.23	2.20	52.0
Grumman	2.67	2.00	75	3.56	2.00	56	5.61	2.00	45	4.44	1.82[4]	41.0[4]
Lockheed	3.61	1.20[4]	33[4]	5.79	1.88[4]	32[4]	7.94	2.60[4]	33[4]	6.12	3.00	49.0
Martin	3.03[2]	None	None	7.06	None	None	7.85	1.00[4]	13[4]	4.92	1.50[4]	30.5[4]
McDonnell	4.49	1.00	22	6.18	1.00	16	5.03	1.00	20	6.33	1.00	15.8
North American	2.28	1.25	55	3.72	1.50	40	6.46	2.75	43	9.42	4.50	47.8
Northrop	4.22	1.00	24	3.64	1.00	27	5.25	1.00[4]	19[4]	7.89	1.60	20.3
Republic	7.32	1.14[4]	16[4]	6.83	1.50[6]	22[4]	6.71	2.00[4]	30[4]	10.01	3.00[4]	30.0[4]
Ryan	2.23	0.50	22	3.80	0.50	13	5.15	0.50	10	4.07	0.50	12.3
United Aircraft	5.18	2.00	39	6.22	2.75	44	7.65	3.50	46	6.14	2.75	44.8
Average			33.5%			34.7%			30.3%			34.7%

NOTES: All computations on outstanding share capitalizations prevailing at fiscal year-end.
[1] On adjusted average shares outstanding during year.
[2] Excludes nonrecurring and special items.
[3] Convair merged into General Dynamics for 1954.
[4] Plus 10% stock dividend.
[5] Plus 25% stock dividend.
[6] Plus 5% stock dividend.
[7] Deficit.

Aircraft cash dividends, relative to earnings, may not be liberal, but they are definitely assuming an undertone of stability. In the industry's earlier years, dividends, when declared, were usually in the form of a year-end disbursement. In time the pattern improved to semiannual payments. Currently, almost every aircraft company follows a policy of regular quarterly cash disbursements to stockholders. This tends to improve the investment status of the group.

Navy Doubles Request For Missile Money

Navy Bureau of Ordnance has nearly doubled its guided missile money request for fiscal 1957 over the current year but the Bureau of Aeronautics' is seeking only $2.4 million more to buy missiles.

BuOrd asked Congress for $159.2 million as against $83.4 million voted for the current fiscal year. Missiles to be purchased by BuOrd next year include the Fairchild Petrel, Bendix Talos, Convair Terrier and Tartar and a still-classified "bird" which has just been ordered from a second source and which will account for $37.7 million of 1957 money.

BuAer wants $157.4 million next year, compared with nearly $155 million appropriated for 1956. The sum covers $73.5 million worth of service missiles (Sperry Sparrow and Chance Vought Regulus) and $93.5 million for evaluation missiles, including air-to-air, air-to-surface and ship-to-surface models.

B-52 Production Likely To Be Increased 18%

Boeing B-52 Stratofortress production is scheduled for an 18% increase by USAF if Congress acts favorably on the Administration's request for a $547-million supplemental defense appropriation in fiscal 1957. About $248 million of this is earmarked for B-52's.

The new increase will complete replacement of Convair B-36s and attain the planned B-52 force well ahead of present schedule. Earlier deliveries of those planes already under contract will be possible, and 29 more may be ordered with the 1957 money, according to Dudley C. Sharp, Assistant AF Secretary for Materiel.

Boeing's Seattle and Wichita plants can handle the increase, and no third source is planned. Present USAF timetable schedules 11 B-52 wings to be completed for Strategic Air Command by late 1958 or early 1959. New boost may advance completion by several months.

Insurgents Gain 2 Places on WAL Board

Western Air Lines now has two "insurgent" directors on its board following the annual directors meeting last month in Los Angeles.

Added are William S. Barton, a Los Angeles attorney, and Gordon Y. Billard, a partner in the New York firm of J. R. Williston & Co.

The new group first made inroads on WAL's board last year when John W. Templeton, New York investment counselor, showed up with enough stock backing to force a seat on the board.

Two regular WAL directors, Stanley R. Shatto and Marvin W. Landes, were temporarily unseated at last month's meeting. Subsequently the board was enlarged from 13 to 15 and Shatto and Landes were reinstated.

Billard, who said he himself owned 2,000 shares of WAL stock, read a prepared statement to stockholders strongly criticizing WAL's management and singling out the carrier's recent strike, which he called "costly" and "a breakdown in labor-management relations."

Billard appeared with proxies for 55,330 shares and Barton, 57,684.

$25 MILLION MAINTENANCE BASE TAKES SHAPE

TWA Overhaul Facility Heralds New Era

Best tools, equipment and practices yet developed by industry incorporated in huge new $5.5-million plant at Kansas City, Mo.

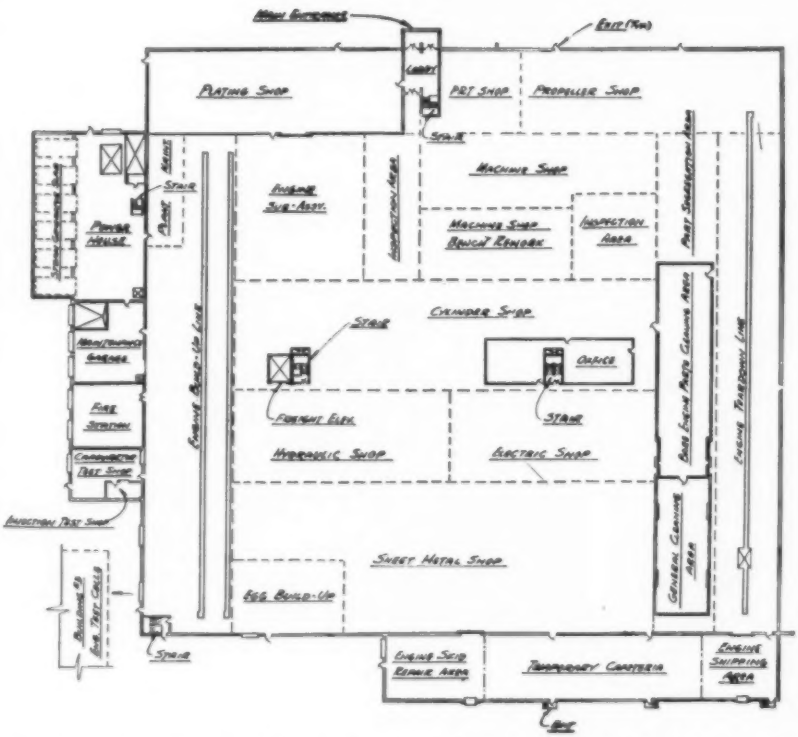
By JOSEPH S. MURPHY

KANSAS CITY, MO.—As engine serial No. 68030 moved off the assembly line onto an overhead conveyor at Mid-Continent International Airport here one day last month, Trans World Airlines ushered in a new era in air transport maintenance.

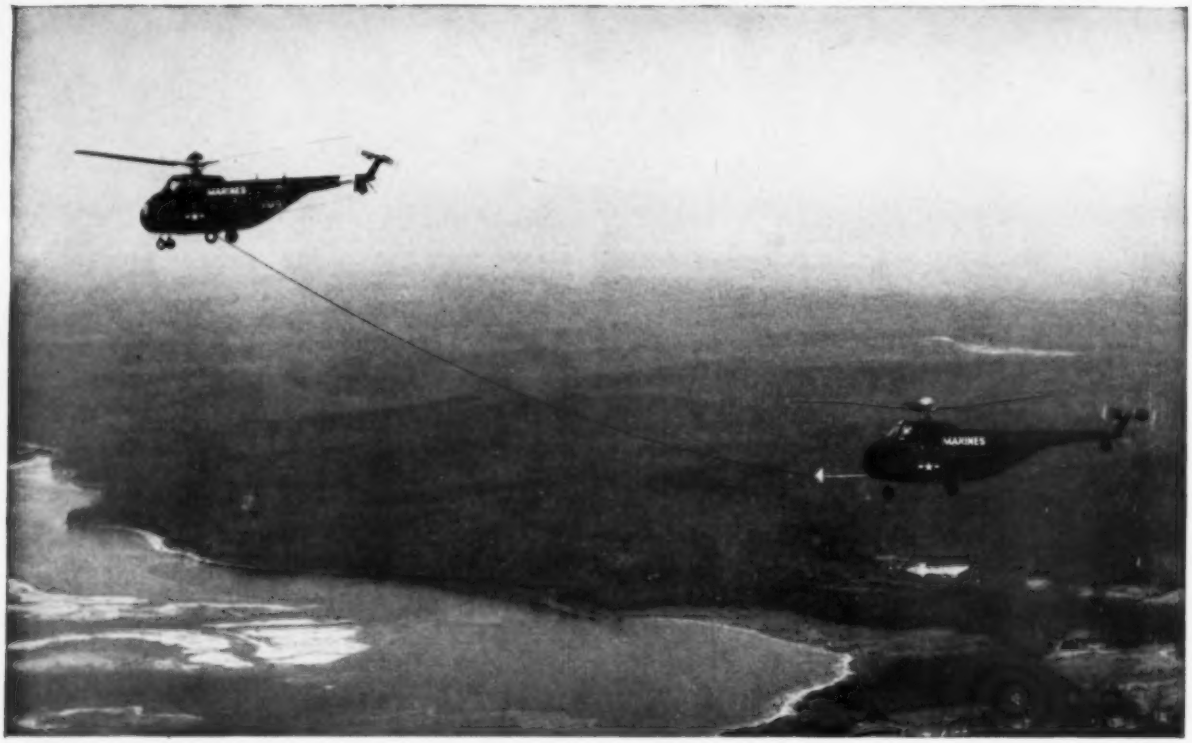
For TWA the event was doubly significant. This engine was the first product of its new $5.5 million engine overhaul plant. It also marked the first big step toward full-scale operation early next year of a brand new $25-million maintenance base, without question the most modern the world over.

But to the U.S. airline industry, the occasion holds almost equal significance. For the 390- by 350-foot TWA engine shop houses within its four walls the pick of the best thinking of this industry in tools, equipment and practices developed over a 20-year span of modern transport operation.

TWA's Platte County, Mo. engine shop is the last word in mechanization. From the time an engine is hung on one of sixty new Whiting stands for teardown (they cost TWA about $2,000 each) until it moves off the final assembly line, virtually no major part



Floor plan shows "horseshoe" layout of new shop. Parts feed from teardown line at right through cleaning, inspection and repair to build-up line at left.



IN-FLIGHT REFUELING technique for helicopters is demonstrated for the first time by two Marine Corps Sikorsky HRS helicopters. By increasing potential range and payload, aerial refueling can give still greater versatility to the helicopter. The HRS is the Marine Corps version of the Sikorsky S-55, most widely-used transport helicopter.

AROUND THE WORLD WITH SIKORSKY HELICOPTERS

FOURTEEN SEAMEN, five from the bridge, eight from the fantail, and one from the water were saved by an Air Force rescue helicopter when the grounded Japanese freighter *Handa Maru* broke up in 40-foot waves off Honshu, Japan. The Sikorsky H-19 lifted men to safety despite high winds. Note man in rescue sling, circled.

LIFEGUARD FOR TEST PILOTS, Sikorsky S-55 recently purchased by Grumman Aircraft arrives at company's Bethpage, L. I., airfield. Grumman will use the S-55 as a stand-by rescue aircraft while testing its Navy jet fighters off the Atlantic coast. Grumman's S-55 has a 600-pound rescue hoist and flotation gear.

ANTI-SUB SQUADRON HS-5 is first Navy unit being completely equipped with 14 large Sikorsky HSS helicopters. Based at Key West Naval Air Station, the new squadron is first of a number still to be formed which will fly the HSS. Eight pilots and eight crewmen are shown above at Sikorsky Aircraft in Bridgeport, where they were checked out in their new aircraft. The HSS tracks submarines with sonar gear and can launch torpedoes or lay mines. The high-performance helicopter also serves with other armed forces and, in commercial versions, is scheduled for airline passenger service this year in the U. S. and Europe.

HELICOPTER HISTORY

FIRST HELICOPTER AIRMAIL

On May 16, 1943, at the Capitol, U. S. mail was carried by a helicopter for the first time, commemorating the 25th anniversary of air-mail. The Sikorsky R-4B was flown by Capt. (now Brig. Gen.) H. Franklin Gregory. Sikorsky helicopters now carry not only mail but freight, express, and passengers in regular daily service.

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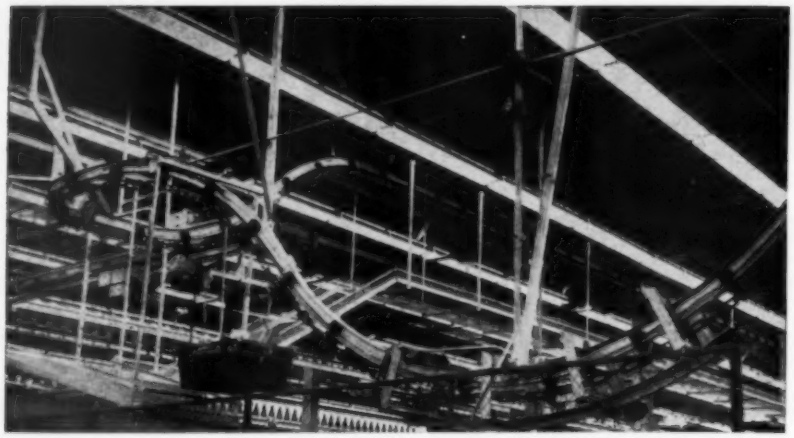


Maze of conveyors typifies extent to which TWA shop is mechanized. These trolley conveyors move parts from basement warehouse to strategic shop locations on floor above.

is hand carried more than a few steps.

Efficiency Increases

• **The net gain** to TWA from this new-found efficiency is a sharp jump in its engine overhaul capacity. Instead of overhauling six engines a day working on a three-shift basis, it can now complete seven engines a day on a single shift. Whereas, in past operation, about half of its overhaul force had to work evening and night assignments, more than 800 shop mechanics are now assigned a single day shift, five days a week, with weekends off.

As each engine enters the shop for overhaul, an underfloor tug continuously moves it through nine disassembly stations at an 18-foot per hour pace. Here major sections are removed and placed on adjacent roller conveyors which carry them to a cleaning area that parallels the teardown line.

A new $125,000 automatic cleaning unit built by Ransohoff, Inc. of Hamilton, Ohio handles parts from seven engines on a single work shift. Complete cleaning cycle takes two hours with this sequence: 20 minutes in a three-stage degreaser of 1,800 gallons capacity; four 20-minute intervals in successive decarbonizing tanks totaling 8,000 gallons; then, a final 20 minutes through a three-stage rinse of 1,800 gallons capacity. Throughout the process Turco products are used for parts cleaning.

Engine cylinders get a special treatment. After removal from the engine they move on conveyors through a fast-acting Ransohoff degreaser. Carbon is next removed in a new automatic walnut-shell blast machine built specially for TWA by Vacu-Blast Co. of Belmont, Calif.

Results of Long Study

In virtually every area of the shop a new overhaul jig or piece of test equipment marks the results of a three-year-long study by TWA engineers of every major airline and military facility in the U.S. and abroad, each one tailored to best suit the airline in its new plant.

• **Some examples:** A pair of fast-action ovens bring cylinders up to temperature in a matter of minutes for exhaust valve guide and seat-removal, then later for installation. Because complete cylinder overhaul can be handled in three days less time than the average engine, TWA solved the stocking problem by routing overhauled units around the ceiling of the shop on a 1,270-ft.-long variable-speed conveyor. Each engine set is identified by number and arrives at the assembly line to meet the buildup schedule.

Linking each of the key work stations is a vast $200,000 network of conveyors that makes hand-carrying of parts and use of powered shop carts almost a thing of the past. Supplementing this in-shop materials-handling system are three other stores-conveyor networks costing about $172,000 that link the main warehouse (beneath engine overhaul) to the engine shop and new aircraft hangars.

These stores-conveyors, capable of handling parts weighing up to 125 pounds, do about 90% of TWA's entire parts-handling job. For bulky or heavy-weight items, the airline has settled on electric-driven or propane gas-powered vehicles for use inside shop areas. This dispenses with operation of gasoline-powered trucks and the fumes and dirt they usually contribute.

• **Key feature** of the conveyor installation is a system of feeding parts from a warehouse below engine overhaul up through the floor to stations spotted throughout the working area. An indexing system for parts carriers allows pre-selection of a desired drop-off point. When the shipment arrives at that point a "matched" micro-switch-operated unloading device removes the carrier from the conveyor.

Backing up this flexible parts-distribution is a second system of on-the-job parts-stocking. TWA stores officials figure they now have about $250,000 in spare parts within arm's reach of mechanics, almost double that at its former Fairfax location.

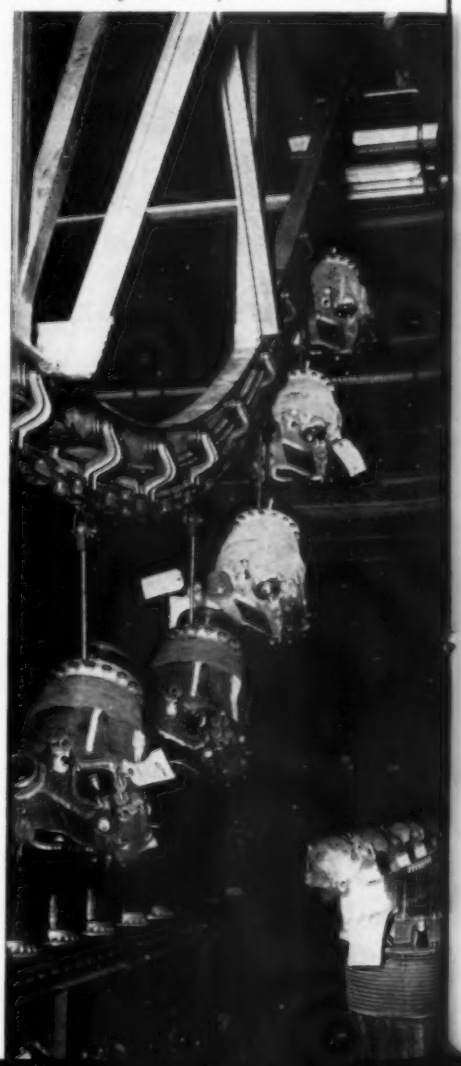
IBM Card System Used

A pre-punched IBM card system also gives shop technicians a rapid parts reordering setup and at the same time provides TWA with an accurate record of parts consumption for inventory control purposes. Pending installation of a pneumatic tube system, special pouches carried on conveyors bring stock orders from work stations in the shop to a central control location in the warehouse.

Assuming the replacement item is on hand, the new supply is on its way back to the shop in little more than the complete cycle time of the conveyor —about 28 minutes.

• **All told, TWA's** stockroom eventually will handle some 54,000 separate stock items to serve its overall

After overhaul, cylinders "ride" 1,270-foot long overhead conveyor for three days—arrive at engine build-up line when needed.



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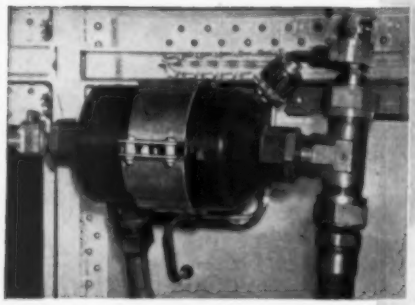

Point of no Return

When a USAF TM-61 Martin Matador leaps from its launcher, it has passed its point of no return. Its mission calls for a one-way trip to the target. The Matador must function perfectly if its mission is to be accomplished. There is no turning back for repairs.

Fuel flow plays a vital part in sending the Matador to its objective. At the speed it travels even a momentary interruption could cause serious deviation in flight characteristics. Martin needed a filter to remove foreign material from the fuel. A filter that would function perfectly, yet be expendable, light in weight, resistant to corrosion. The filter had to have a minimum shelf life of two years. They came to Purolator for a special design.

The Purolator filter designed for use in the Matador filters down to 5-10 microns at a flow rate of 18 GPM. It can be connected directly to auxiliary fuel tanks outside the missile so that fuel on board is not consumed during pre-flight calibration operations. Its construction is resistant to corrosion, has the required shelf life, yet it is lightweight and expendable. A perfect example of Purolator's ability to engineer and manufacture filters for special needs . . . no matter how stringent the requirements are.

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airline operating needs. Right now, with the new engine shop in operation, about 8,000 items have been shifted to the new location.

The basic shop layout employed by TWA is a functional one, following a horseshoe pattern. As parts are removed from engines moving down the disassembly line they feed first through cleaning, then inspection and finally repair, to wind up almost at the exact point at which they are needed on the build-up line.

Like the disassembly line, TWA's build-up arrangement employs automobile production line technique. Again using Whiting stands, engines move at about 10 feet per hour through 23 work stations.

To Erect Test Building

• **Still to be commissioned** is another important feature of the new overhaul setup. A $1.5 million engine-test building housing five dynamometer-type test cells, developed in conjunction with Clayton Manufacturing Co. of El Monte, Calif., will bring to U.S. airline operation a more accurate and almost noiseless form of engine-testing.

Instead of the historic propeller "club" to absorb engine power, each $85,000 Clayton unit does this same job by using this power to turn the turbine wheels of an oil dynamometer.

This not only gives TWA a more accurate measurement of engine power on today's piston engines, but could be adapted to test turboprop engines up to 10,000 shaft-horsepower ratings simply by hooking two of the 5,000 hp dynamometers together. As an added bonus, water used to cool the oil will be taken off in the form of steam for heating and airconditioning the new engine shop and warehouse. ◆◆◆

American Aviation Directory Contains 25,000 Names

The 33rd edition of the AMERICAN AVIATION World-Wide Directory, the 1956 Spring-Summer issue, just off the press, contains more than 25,000 names of aviation executives, companies, organizations and products.

New features are a list of all aviation house organs published, with the names of editors, and revised equipment manufacturers' and buyers guide sections. These sections have been revised in accordance with the Standard Industrial Classification Code used by leading industrial firms and the Bureau of the Census.

Copies of the AMERICAN AVIATION World-Wide Directory, which contains more than 900 pages of currently useful facts, are available from American Aviation Publications, 1001 Vermont Ave., N. W., Washington 5, D. C.

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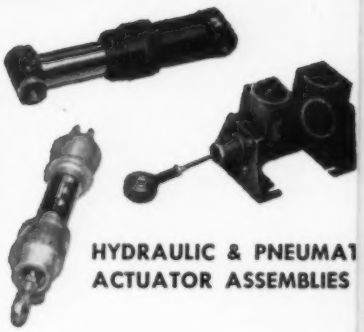
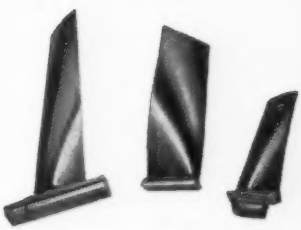


HYDRAULIC & PNEUMATIC ACTUATOR ASSEMBLIES

FUEL NOZZLES FOR JET ENGINES



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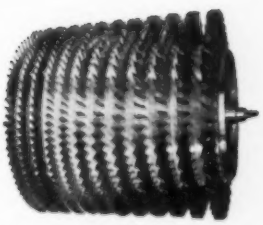

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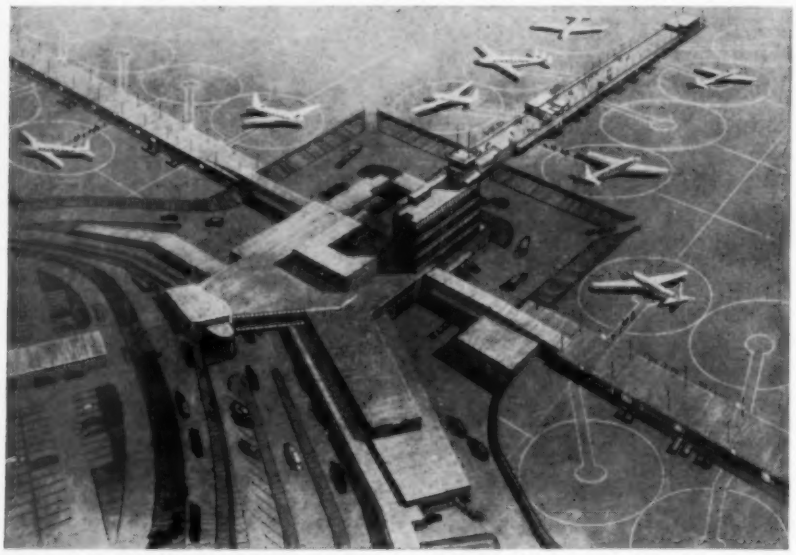
Airport Operators Hear Suggestions For Better Terminals, Runways, Taxiways



CLEVELAND-HOPKINS new look, in architect's rendering, shows new $4-million terminal recently dedicated but operating since last February.

By LOIS C. PHILMUS

Philadelphia (Special) — Airport planners finally got some answers to some vital questions on what to expect in the jet age last month when the Airport Operators Council convened its 9th annual meeting in Philadelphia. The general tone for the first time was reversed from "you've got a problem" to "here's how it may be solved" when manufacturers, airlines and government officials joined forces to get down to cases.

• A panel of airline officials painted in broad strokes what will be needed in terminal and ground facilities to handle the predicted traffic increases and the new jet transports.

• An airport construction expert lent an optimistic note to airport operators' concern over huge financial investments in runway and taxiway strengthening and lengthening. His report on investigations made by the Institute of Transportation of the University of California indicated that there are possible compromises to previous extremes expressed.

Lowen Tells of CAA Plans

• CAA Administrator Charles J. Lowen revealed plans to acquire two B-47s, a B-57 and some T-33s to work out penetration and approach procedures and determine facility requirements.

Lowen expressed hope that at a later date CAA would be able to operate either a DC-8 or Boeing 707 along actual scheduled routes to gain realistic facilities requirement data. He told AOC he was negotiating with the two manufacturers to "lease, beg, borrow or steal" jet transport prototypes to accomplish this aim. The B-47s will be at CAA disposal around June 1.

• **CAA Airport Director Herbert Howell** timetabled the new four-year airport aid program as follows: the fiscal 1957 plan will be announced around early May; fiscal 1958, about January 1, 1957; and fiscal 1959, about January 1, 1958.

Advance programming to date has been prevented by the pressure of work, Howell said, but added that "after the announcement of the 1957 program, we hope to be in a position so that we can entertain and grant requests for tentative allocations for future fiscal years."

As of January 1, requests for $250 million had been received. More have been received since for the four-year program. "We haven't had a rush of project applications submitted," Howell said, "but some are under grant and quite a few are ready for the issuance of grant offers." He added that $35 million would be under grant by the end of the current fiscal year and in 1957 "we expect to place about $75 million under grant as the program gets into full swing."

The airline panel presented a composite of the terminal of the future. Ideally, it would be a modified one-level structure providing suitable passenger separation. C. H. Taylor of Capital labeled this "the most logical" expansion.

Taylor proposed that, since the trend is toward processing boarding passengers at the gate, suitable facilities—heated corridors, scales, small waiting rooms and small counters—be set up there with waist-high rails that would segregate the incoming and outgoing passengers. With this form, ticket counters would be free for ticket sales and passenger service only.

• **Specifically,** with the coming of jet transports and the predicted traffic, Randall W. Kirk of Pan American World Airways said, (1) 34 to 60% more loading positions would be needed than are now available; (2) clearance circles will have to be 220 feet; (3) clearance from jet exhaust to buildings, personnel and other aircraft will have to be increased to 100 feet; and (4) turning circles for taxiing near buildings will be 230 feet. In addition, since the transports probably will be taxied, sufficient area must be provided to permit taxiing to and from loading areas.

The serious problem of baggage handling received considerable attention. D. W. Heep of Trans World Airlines called for help from the airport operators in (1) designing a facility that does not require double handling of carts or bags; (2) removing obstacles that might prevent placing the facility near ground transportation; (3) providing adequate space for inbound and outbound rooms which are protected from the elements; (4) properly heating and ventilating baggage area; and (5) keeping abreast of latest developments in mechanized baggage-handling.

• **But the No. 1** financial concern of the airport operators is that of runways and taxiways. Encouragement came from Robert Horonjeff of the California Institute of Transportation. Reporting on studies made at Los Angeles, San Francisco and Oakland, he observed that "some savings in costs possibly could be made by taking into account the variation in load applications across the width of the runway."

Investigations to date have "indicated that traffic on the runway is fairly well centered," Horonjeff said. This leads to the conclusion that while some strengthening will be necessary, it may be confined to only the central runway portion and exits to taxiways.

• **First official indication** that something may be done in the future to preclude the need for constant expansion of airports was sounded by the CAA Administrator as a parting note.

"We have a right to expect a kind of aircraft to be developed," Lowen said, "that will be more economical of facilities on the ground. One thing is certain, we cannot go on year after year expanding all our airport facilities."

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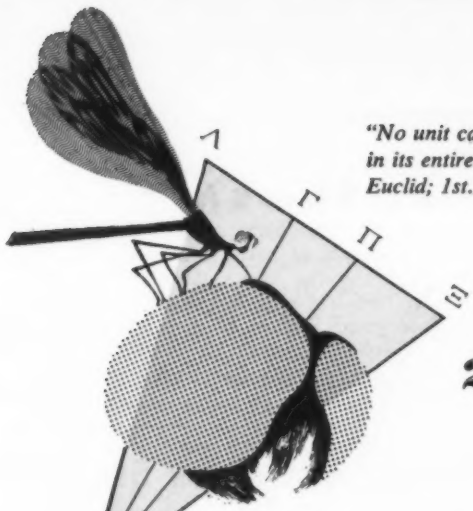

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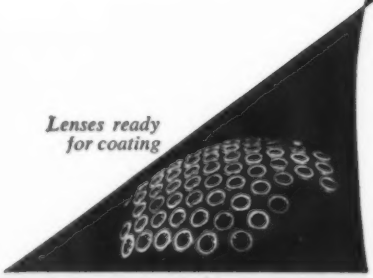

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Hycon Names Gardner Chairman of Board

Trevor Gardner, former assistant Secretary of the Air Force for research and development, has been named chairman of the Board of Hycon Manufacturing Co., Pasadena, Calif.

Gardner was one of the founders of Hycon in 1947. The company is active in the electronics, guided missiles, ordnance and photographic fields. A subsidiary, Hycon Aerial Surveys, Inc., does world-wide aerial mapping and geophysical surveys.

Gardner severed all connections with the company in 1953 when he entered government service.

BOAC Names D'Erlanger Chairman of Board

Gerard J. R. L. D'Erlanger and Sir George Cribbett have been appointed chairman and deputy chairman, respectively, of British Overseas Airways Corp.

D'Erlanger, who succeeds Sir Miles Thomas, has had a long aviation career. He was associated with the pre-war Hillman Airways and British Airways. During the war he was commandant of the Air Transport Auxiliary, a civil organization which ferried military aircraft.

D'Erlanger was on the board of BOAC from 1940 to 1946, when he joined the board of British European Airways as director-in-charge. He was chairman of BEA from 1947 to 1949. A wealthy businessman, he will serve part-time and will accept no remuneration, since income tax would represent 100% of his salary.

Sir George will draw a salary of $14,000 a year. Aged 58, he has acquired a world reputation as a negotiator of air agreements.

USAF, Army Cancel Vertol's YH-16 Contracts

Development contracts for Vertol Aircraft's 40-passenger 30,000-lb. YH-16 helicopter have been canceled by USAF and Army.

Army said its cancelation was due to "reduced appropriations and promising progress in other development areas." These areas are said to include short and vertical takeoff planes and a still-classified "crane" type helicopter. The Morton, Pa., manufacturer had hoped for military and commercial production orders for the YH-16, but termination of development work virtually eliminates these possibilities.

Military Obligates $2.2 Billion in 8 Months

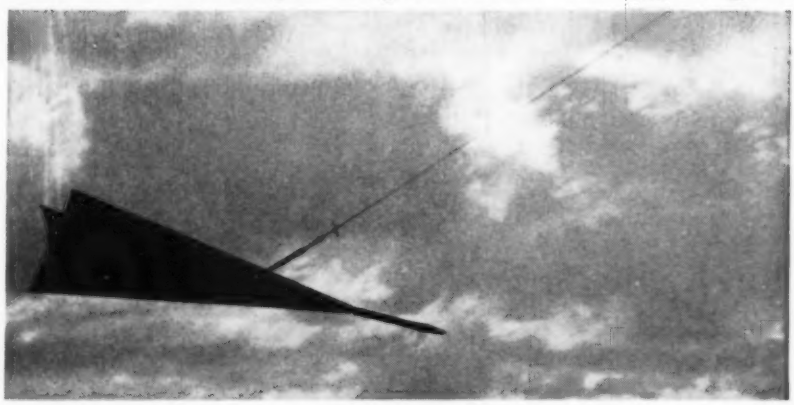
The three military services had obligated a total of nearly $2.2 billion for aircraft by the time eight months of fiscal 1956 had elapsed but still had an unobligated balance of more than $10.5 billion for aircraft on Feb. 29, according to Pentagon comptroller W. J. McNeil.

During the same period, spending for aircraft amounted to more than $4.6 billion but the unexpended balance approached $18 billion.

Obligations for guided missiles by the three services during the July through February period came to more than $800 million although the Army, Navy and Air Force had more than $1 billion in missile money unspent on Feb. 29.

Missile spending over the eight months rose to more than $721 million, while the unexpended balance figure for missiles topped $2.5 billion.

Beech Develops Supersonic Tow Target



Beech Aircraft Corp.'s missile engineering division has come up with a new supersonic aerial tow target that will give trainee fighter pilots something new to shoot at in gunnery practice.

The Beech Dart, a refinement of a Navy development two years ago, is 12 feet long and constructed of a 3-inch diameter steel tube having four triangular plywood fins. The Dart's tail measures four feet across at the rear of the fins, which are mounted in cruciform fashion.

In operational use the supersonic target is towed by a jet fighter via a long nylon rope. Pick-up for initial flight is by the snatch-launch system employed for gliders.

Variations of the basic gunnery target provide a remote-controlled smoke generator for visual identification. Another now in the experiment stage is being built from frangible materials so that it will break up when a hit is scored.

As an added target feature, the Dart incorporates four radar reflectors installed near its tail. These may be used for ground and airborne radar "lock-on" in tracking, gunnery, rocketry and missile firing missions.

How RADIO-WEB, French Navigation System, Works

'Non-line-of-sight' network invented by Pierre Gaudillere gains attention of Air Navigation Development Board officials.

By HENRY P. STEIER

If international tensions lessen in the near future, the present rho-theta navigation and radar traffic control techniques may become a thing of the past, and a non-line-of-sight system may replace it.

This is the opinion of James L. Anast, Air Navigation Development Board, who was recently "loaned" to Edward P. Curtis' Presidential Aviation Facilities Planning Group.

Anast emphasized, in a talk before the annual meeting of the Institute of the Aeronautical Sciences this year, that "this (present) system based on radar coverage wherever necessary is a product of the international political situation."

He noted that latest studies indicate we are reaching the point of diminishing returns with such systems in the use of the radio spectrum, cost and complexity.

• **First improvement** in cost and complexity, Anast said, would come through elimination of four-course ranges, VOR, DME or TACAN would gradually give way to a non-line-of-sight system. Such a system, he added, "will never be replaced if our air-defense radar drops out of the picture." However, he cautioned, "if radar stays in, the ultimate navigation system will be a radar-calibrated, short-term stability, self-contained system."

An electronic technique is under investigation in Europe that offers promise of solving in one big system change the current and future forecasted problems in air navigation, traffic control, collision prevention and ATC selective-calling of specific aircraft.

Anast, in talking of a non-line-of-sight system in the future, and the "better chance both economically and technically" for such a system, said it might be one "such as Radio-Web."

• **Radio-Web** is currently under development in France. Its inventor is M. Pierre Gaudillere, general manager of the Société Francaise des Telecommunications Laboratoires (French Society of Laboratory Telecommunications). A demonstration network has been set up near Paris and, according to Gaudillere, ANDB officials have visited the laboratories and a demonstration of the system.

Giving the reason for developing Radio-Web, Gaudillere said, "In this century of electronics, it must be asserted that a well put-down problem is generally half-solved ipso facto."

The system, he claims, is capable of providing the navigation and control of all aircraft at all distances, at all altitudes, with a single ground system, by entirely automatic means and using known techniques.

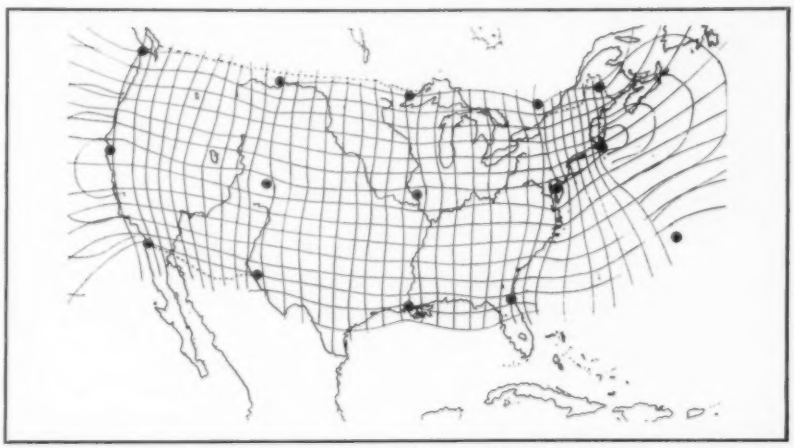
Uses Four Transmitters

Radio-Web uses signals from four transmitters. For area navigation these are arranged in pairs so that lines drawn between paired stations would form a cross shape. Two types of position determination are achieved in an area served by the system.

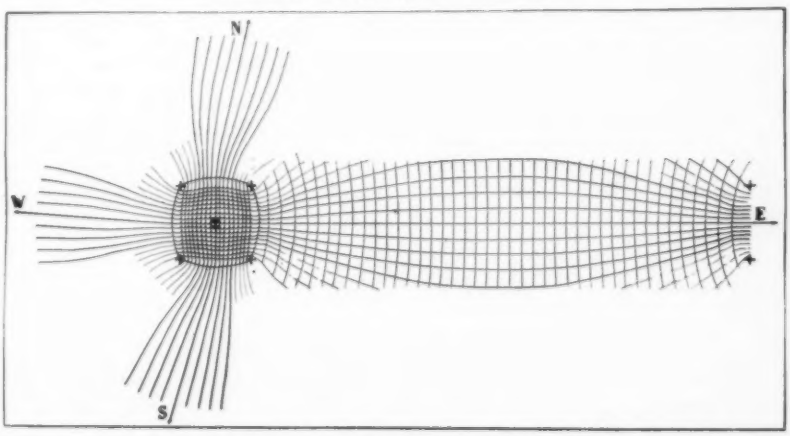
One type is referred to as "subjective position determination." It enables the operator of a mobile object (aircraft, sea or land vehicle) to determine his position in the area. The other, "objective position determination," enables a ground control post to know where the mobile object is.

Taken in pairs, the transmitters emit radio frequency signals that are amplitude-modulated by different audio frequency signals very near one another. For example, 384 and 385 cycles per second were chosen for the test system now built in France.

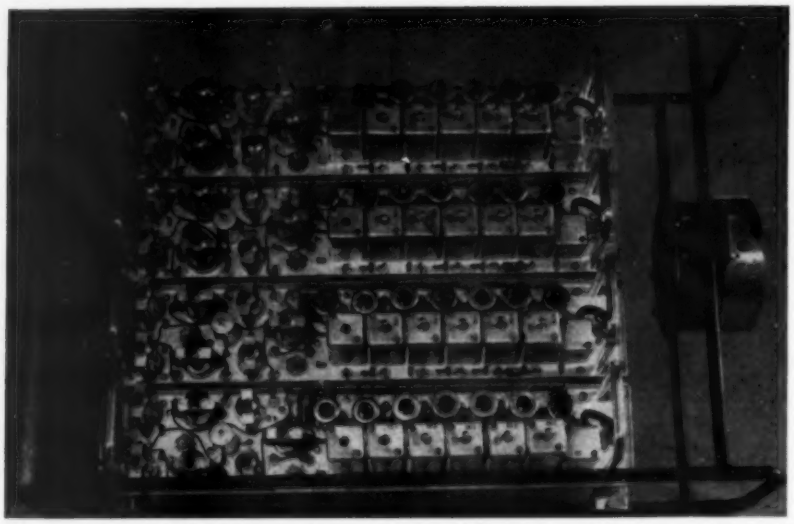
• **Using these signals,** two param-



Estimate of position lines that would be created using 15 Radio-Web transmitters operating in 90-110-kilocycle band for determination of aircraft locations in U.S. by ground-control stations. Each channel or block would be identified by a number corresponding to its position in the area. Airborne equipment could, however, resolve its exact position in any of large blocks served by two pairs of transmitters.



A terminal area could be beaconed with four multitrack airways leading to an airport by arranging Radio-Web transmitters in the pattern shown. The center quadrangle would be the airport area and is served by two pairs of transmitters operating to form a fine-grain network of position lines. These might also be used for ground surveillance and control of aircraft.



Experimental model of airborne equipment showing four receivers to pickup radio signals and detect audio phases of signals from four Radio-Web transmitters. This equipment was designed for mounting in a truck used to run initial tests on localization accuracy of a system now in operation in France.

eters of the signals are put to use-time and electrical phase of the audio signals. At certain points between two paired stations the phases of the audio signals are equal. These points form a curve that is substantially a hyperbola whose focus is at the transmitter location. This curve moves in continuous motion between paired transmitters. This moving line is termed an "isophase line," and the term was selected to distinguish it from "equiphase lines" on which lay the points where the phases are equal, but which describe static lines.

Isophase lines scanning an area would be received on board an aircraft by receivers tuned to the paired stations' frequencies. After detection of the audio signals their phases are compared. Also, at a given time an "initial signal" is sent from one of the transmitters. The time that elapses between emission of the "initial signal" from the reference point to reception of the isophase line, at which audio signal phases are the same, then permits the receiving point to be determined.

By integrating information on initial signals from two pairs of transmitters and time to passing of the isophase lines, a "fix" based on "X" and "Y" coordinates for the beaconed area would be obtained for the aircraft's position.

• **A definite relationship** exists between the audio modulating frequencies, distance between transmitters of each pair, and the scanning speed of the isophase line between any two transmitters.

No more than a single isophase line should exist at a given instant between transmitters if non-ambiguous signals are to be achieved, and it is this consideration that sets limits on the audio frequencies versus distance between transmitters.

The speed with which the isophase lines scan an area is also important, since practically continuous indication is required to avoid lapses of information. This is especially important to high speed aircraft and to operations in a congested area.

However, for practical purposes, the scanning speed over large areas need not be as fast, as for example on airways, or in terminal approach or landing areas.

• **The relationships** work out so that for transatlantic navigation a slow scanning speed of five seconds would be obtained if audio frequencies near 50 cycles from transmitters 3,700 miles apart were used. For navigation in congested areas, frequencies of 500.5 and 499.5 cycles per second from transmitters 375 miles apart would give a scanning rate of about one second.

For smaller areas frequencies of 3002 and 2998, for example, from transmitters about 31 miles apart would give a scanning rate of one-fourth second. As the distance between transmitters is reduced then, the scanning rate goes up and so do the audio modulating frequencies needed.

The economy of frequency spectrum space needed for the system makes it very appealing. The transmitters would probably operate on different carrier wave frequencies, to simplify separation of the audio frequencies in detection equipment, and pairs of transmitters would be separated by a few kilocycles. But the total spectrum used would be small since very narrow bandwidths are required for any of the functions.

• **An unusual feature** of Radio-Web is its suitability to use with any radio frequency. The bands would be chosen according to propagation requirements and conditions. However, for economy of transmitters, and considering range conditions, the lower frequencies would be most applicable in most uses.

Long-range navigation might use frequencies near 90 or even down to 10 kilocycles. Multiple path airways might use 200- to 400-kilocycle frequencies. For terminal areas high, very-high, or ultra-high frequencies might be used.

The lower radio frequencies, being non-line-of-sight, would provide adequate signals for helicopters and low-flying aircraft in en route areas. The higher frequencies in clear areas free of obstructions, such as at airports, would also serve this type of aircraft. However, low radio frequencies could be used for areas where buildings and other obstructions might interfere with high radio frequency signals to helicopters operating in the area.

Integration Permissible

• **An attractive feature** of Radio-Web is the permissible integration of airborne equipment for all frequencies of operation. Using the same circuits for isophase-detection and time-interval measurements, only the RF tuning head need be widely variable for tuning all bands in use.

Indications on the aircraft's instruments might take a number of forms. Latitude and longitude might be shown, or azimuth and distance, with reference to some point in the station network.

Or, a pictorial display similar to the Decca Navigator System could be used. Decca is produced by the Decca Navigator Co., Ltd., in Great Britain, and by the Pacific Division, Bendix Aviation Corp. in the U.S. The Decca display uses a moving pen that scribes a line on a chart showing the location and path of the aircraft.

Operating the Radio-Web system for "objective position determination" the location of all aircraft could be determined by ground posts. Operating in the lower frequency bands, the locations of low-flying aircraft and helicopters could be detected, as well as other aircraft.

• **To aid in determining** the positions of all aircraft in an area, each aircraft would carry a transponder. These would emit a pulse each time the isophase lines passed through the aircrafts' locations. By synchronizing a Plan Position Indicator type of cathode ray circuitry with these pulses, and with the initial signals and sweeps of the isophase lines, plan position indications could be obtained at a ground control post.

This would be a cheap substitute for radar, especially long-range radar, and the multitude of radars that would be needed for reporting the positions of

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AERODYNAMICS

AERODYNAMIC ENGINEERS AND SCIENTISTS are urgently needed now at Convair in beautiful, sunny San Diego, California. Excellent career opportunities exist for junior and senior engineers for aerodynamics, performance and heat transfer analyses related to advanced projects in the supersonic Mach number range. A balanced background in experimental and theoretical aerodynamics is ideal for these positions. Analytical aerodynamic studies using analogue and digital computers are an integral part of this work. Challenging positions are also available for aerodynamicists experienced in research and development wind tunnel and firing range tests.

CONVAIR offers you an imaginative, explorative, energetic engineering department .. truly the "engineer's" engineering department to challenge your mind, your skills, your abilities in solving the complex problems of vital, new, long-range programs. You will find salaries, facilities, engineering policies, educational opportunities and personal advantages excellent.

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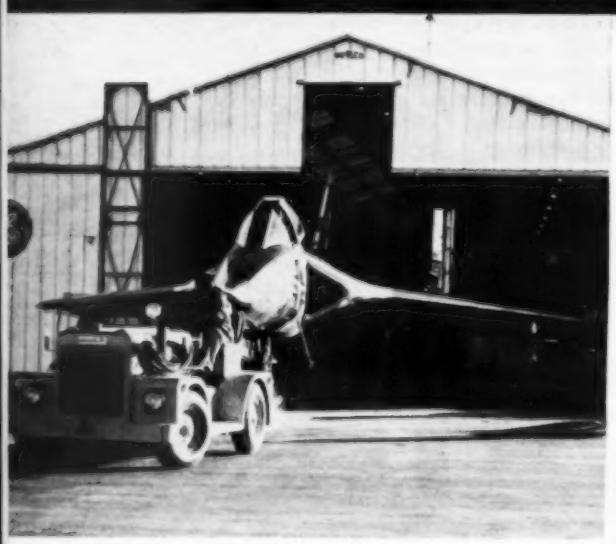
GENERAL ELECTRIC ANNOUNCES . . .

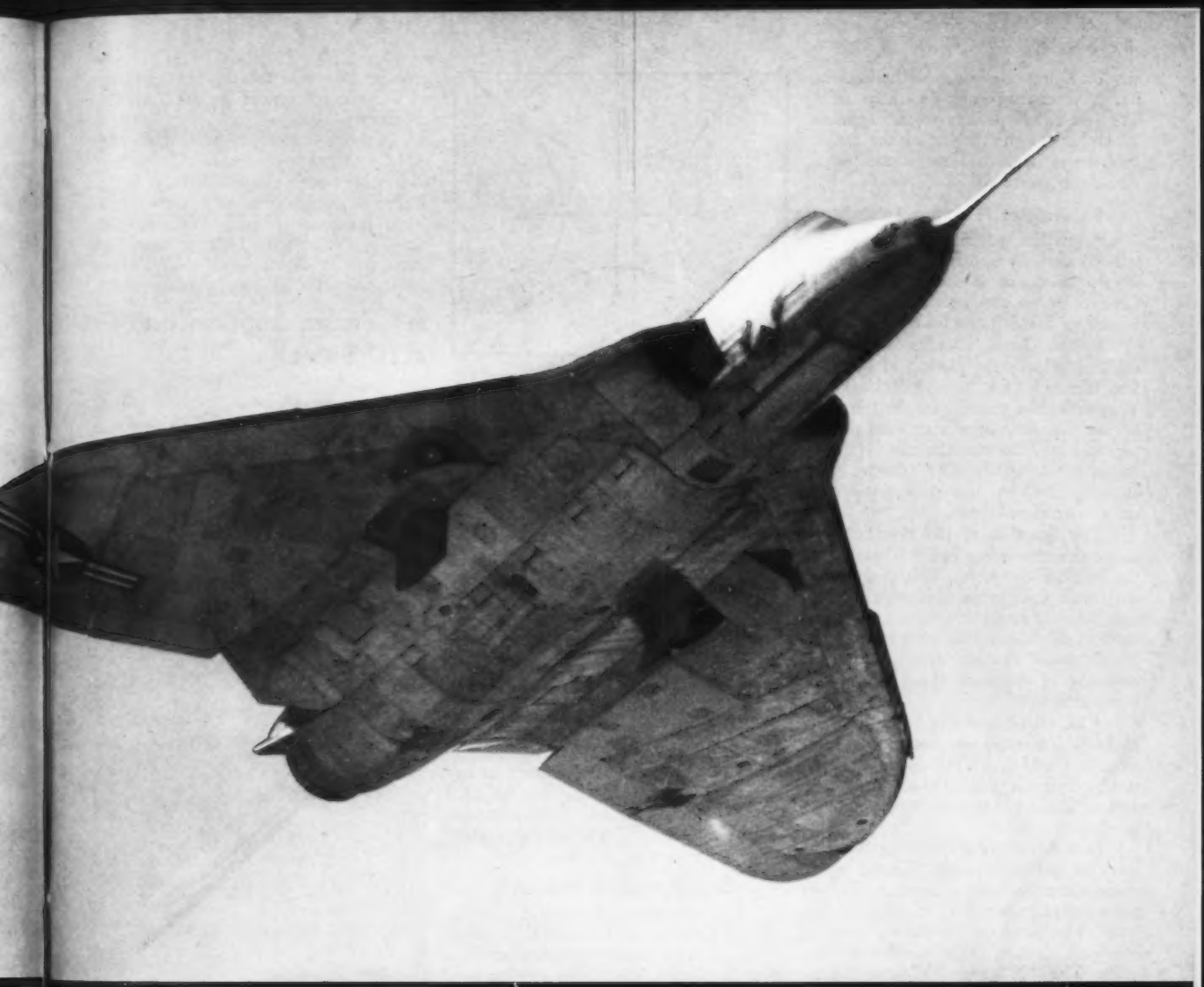
NEW J79 ENGINE FLIGHT-TESTED IN DOUGLAS XF4D

Designed for more thrust per pound of weight than any previous G-E engine, G.E.'s J79 has first flight in single-engine aircraft



PRE-FLIGHT ROLL-OUT. Navy's Douglas XF4D was selected by the Air Force and General Electric as ideally suited for J79 tests—proof of the close co-operation between Armed Services and industry on this vital jet engine project.

G-E TEST PILOT, Roy Pryor, checks XF4D cockpit instrumentation. During test flights at Edwards AFB, engine's stresses were measured by special telemetering equipment on the ground. Pryor was notified by radio of the test results.



Already the XF4D tests at Edwards AFB, California, have proved what many in the industry have known for months. The J79—General Electric's latest and finest jet engine—can develop more lbs of thrust per lb of engine weight than any previous turbojet developed by G.E.

"It was like having a tiger by the tail," said Roy Pryor, G-E test pilot, after he first flew the J79 in an XF4D last December. The J79's efficiency, light weight, and high thrust output made possible outstanding performance during military power climbs, level flight runs—plus throttle bursts during descent.

The joint Air Force-General Electric tests at Edwards are only a prelude to hotter J79 flights to come. But they mark a significant "first" in the aircraft powerplant field.

Never before has a new American jet engine been flight-tested in a single-engine aircraft before initial delivery to airframe companies. The firms now building new planes which will use the J79, will get an engine with actual flight experience in a military aircraft . . . rather than an engine with only factory or flying test bed experience.

Today, over 35,000 G-E J47's power more Air Force planes than any other jet engine. The new J79 with its extremely advanced design and performance features, represents still another potent G-E addition to U.S. airpower. General Electric Company, Cincinnati 15, Ohio. 235-5

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all low-flying aircraft and helicopters. Range is expensive in the radar field. The required power varies approximately as the 4th power of the range. In order to double the range, the power would be increased 16 times.

Saturation Problem Eased

• **Another problem,** saturation of transponders by spurious or too many interrogations, or saturation of ground facilities by too many returns at a given instant, is eased in Radio-Web's system.

Signals from aircrafts would be released only by the passing of isophase line through the aircrafts' locations. They would be spread over the duration of one complete area scan, one second for instance. Several thousand returns might thus be handled during one sweep period, but would be distributed on a time-shared basis.

The question of the third dimension—altitude—arises in consideration of the Radio-Web system. It is conceivable that multiple-layer navigation and detection facilities could be achieved by transmission of different frequencies for use at different altitude levels. Inherent economy of spectrum space use might warrant this.

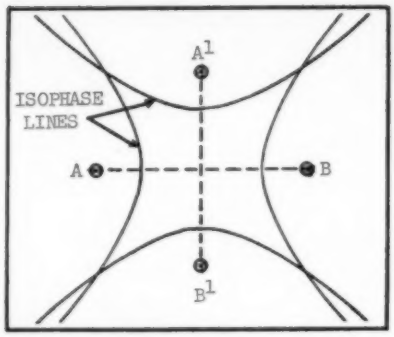
• **M. Gaudillere** says he figures 400 Radio-Web transmitters would be needed to cover the U.S. if VHF operation were used. Operating in 200-400 kilocycle region, about 100 transmitters would be needed.

If the system is used to lay out lines for parallel airways, pairs of transmitters can be located on each side of the airways path and at the ends of the path. The isophase lines then draw a series of airways limits parallel to the path. The "X" and "Y" coordinates from isophase lines define a network of position lines which form a checkered pattern. The "X" and "Y" points can be used as references to sides of the airways and as markings of distance from the end of the path.

There is some distortion of the pattern either at its outer sides, or in the center, depending upon the relationships of distances between the transmitters in a set of four.

• **Another possible feature** claimed for Radio-Web is use of the transponder signals to prevent air collisions. By using a cathode ray tube in a plane with beam-scanning synchronized with signals from the Radio-Web transmitters, position of the plane would show as a spot in the center of the tube screen. Locations of other planes would be displayed in azimuthal reference to the center spot on the plane's tube.

Selective calling is another possibility offered by the unique relationship in the Radio-Web system of an aircraft with reference to time and passing of the isophase lines through its position.



Arrangement of transmitters used with Radio-Web scanning system for position determination. Hyperbolic lines represent locations of points where electrical phases of paired audio signals used to determine position are the same. Called "isophase lines," they sweep across area in directions shown by arrows.

Gaudiller said a ground controller could center a "small luminous circle," generated in a cathode ray tube, around a spot representing an aircraft being called. This would synchronize a pulse signal with the isophase sweep through the aircraft, so as to operate on board the aircraft a call signal such as a buzzer indicating a voice communication request.

Much the same technique of scanning synchronization is carried out in the SAGE and Volscan systems to instruct an associated computer to take action on a command. The command is given by pointing a light-gun at a "blip" representing a plane.

Demonstration Network

• **A dramatic indication** of the low altitude coverage of Radio-Web is given by equipment being operated at this time in France. The demonstration network set up under French government contract uses four 100-watt transmitters located in a 60-mile square. They operate in the medium frequency band (200-400 kilocycles). Preliminary tests were carried out with the aircraft's equipment *carried in a truck*.

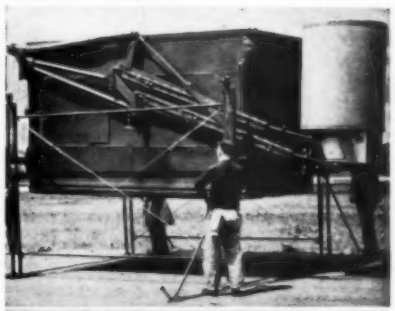
Weight of present airborne equipment is 52 pounds. Efforts are under way to reduce the weight and size of the equipment. A ground control station with PPI indicators is being built.

The system could use frequency modulation if it was found desirable to do so for some reason such as static suppression. Another possibility, that of changing frequencies according to an established schedule, also suggests itself as a way of avoiding seasonal effects on different frequencies, or variations between day and night operation that might occur in the medium frequencies.

• **Rumors of** a "third system" development have been frequent in the wake of the VOR-DME/TACAN controversy. One of the least-mentioned aspects of ANDB's responsibility is its promise last year to continue working on a "back-up" system for the TACAN program.

Although mention was made by ANDB of intent to develop "a continuous wave omni-range" facility in a higher frequency band than present systems, mention of Radio-Web at this time by Anast may indicate some interest now in developing a similar scanning system for future application. ◈◈◈

AF Tacan Station and ATC Tower



Air Force answer to the problem of maintaining navigation aid facilities in event of atomic attack and destruction of fixed facilities is portable Tacan ground stations and airfield control "towers," such as pictured above.

Built by Craig Systems, Inc., the AN/TRN-6 Tacan ground station and Air Traffic Control Central AN/MRN-12 can be carried by truck or aircraft for rapid location of communication and navigation facilities.

The Tacan station is shown in the top photo with the multiple-drum antenna in collapsed position and with lifts used to remove the station from the carrying truck. Arms fastened to antenna lift it into operating position.

The "new look" in air traffic control "towers" is also shown in the photo at bottom. Connected by cable to other parts of the communication-navigation system, the dome of this transportable control center folds into the housing during transport.

This symbol of security through strength identifies the aircraft of the Strategic Air Command. SAC was activated March 21, 1946. For ten years its combat-ready airmen and planes have been the major deterrent to aggression. The entire nation congratulates SAC on its tenth anniversary.

AERONAUTICAL DIVISION, MINNEAPOLIS-HONEYWELL

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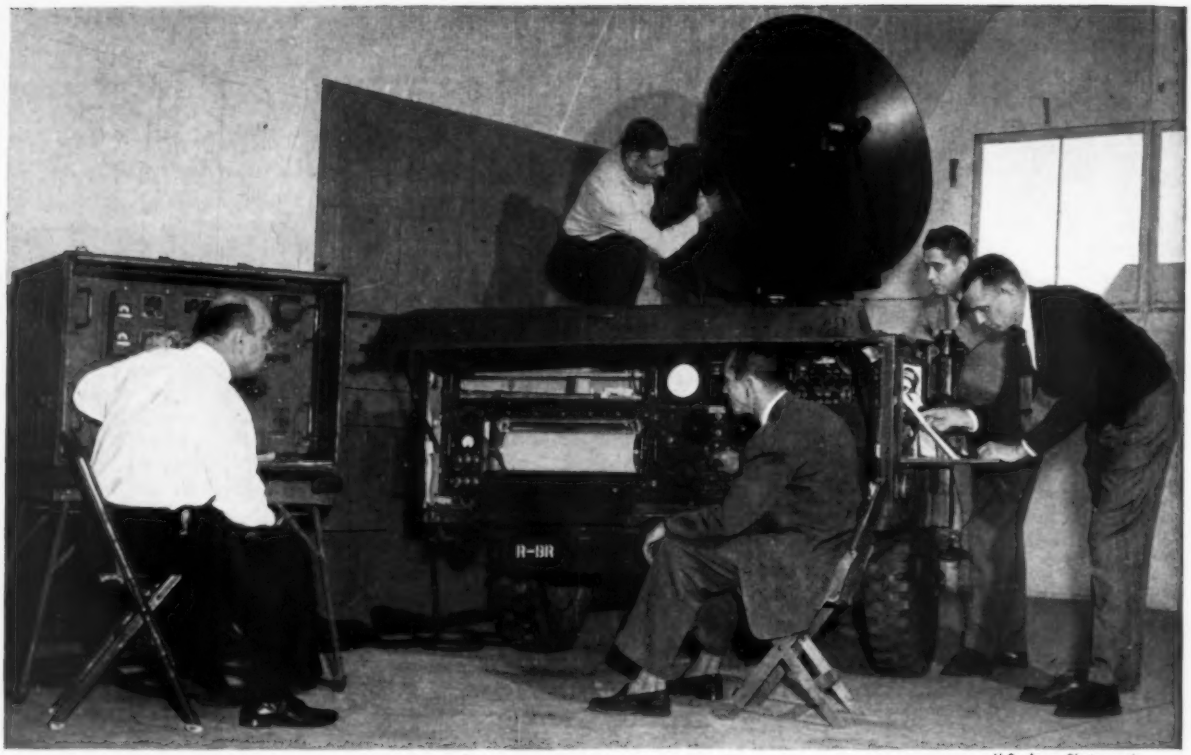

U.S. Army Photograph

Electronic specialists at Ft. Monmouth SCEL Laboratories checking out radar and computing system designed for field use.

ARMY SIGNAL CORPS ENGINEERING LABORATORIES IS A CENTER FOR DEFENSE ELECTRONICS

The Army Signal Corps Engineering Laboratories at Fort Monmouth, N. J., is a house of electronic miracles. Some 4,400 scientists, engineers and technicians at SCEL, and thousands more working with SCEL contractors, strive constantly to keep the United States preeminent in the electronics essential to modern military demands.

The nerves of today's fighting forces are electronic. Radar guides, traces and detects missiles and manned aircraft. It directs friendly artillery and pinpoints enemy mortars, or night troop movements. It measures speed and direction of missiles and vehicles.

Modern armies need constant and effective television, radio and telephone communications. They need devices to detect deadly atomic and hydrogen radiation. And instruments to predict weather around the clock in all the world.

Development of these and an imposing variety of other devices is SCEL's business. Working in close cooperation with its many contracting firms, in private industry, both large and small, SCEL never ceases striving for the electronic perfection that can make the defenses of the free world an armor impervious to all assaults.

This is one of a series of ads on the technical activities of the Department of Defense.

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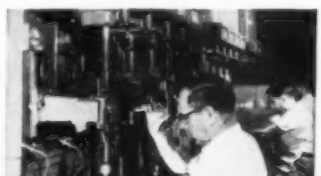


Skilled machinists at Ford Instrument Company, manufacturing precision parts for an Army military computer.

ENGINEERS

of unusual abilities can find a future at FORD INSTRUMENT COMPANY. Write for information.

New Products and Processes

FLOTATION GEAR FOR SIKORSKY S-55

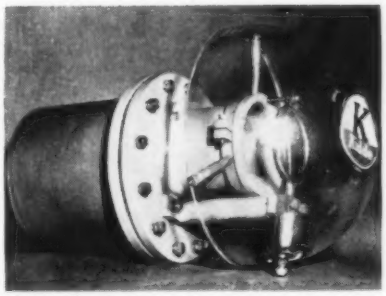
A compressed-air flotation gear for Sikorsky S-55 helicopters for emergency landings in areas where large expanses of water are available has been developed by **Walter Kidde & Co.**

Designated the Inflatair, the gear is powered by 3,000-psi compressed air stored in a Fiberglas sphere measuring 900 cu. in. When actuated electrically by the pilot, a solenoid-operated valve permits the compressed air to flood through four pneumatic lines, each leading to a wheel.

At each wheel, compressed air is discharged from perforations in a ring-shaped element into a 3-in. Inflatair. The compressed air forces free air into the float in sufficient volume to inflate all four rubberized nylon fabric floats at an average internal pressure of 1¼ psi in four to five seconds.

Rear floats measure 66 cu. in.; nose floats, planed for taxiing, 58 cu. in.

CAA-approved, the pneumatic system weighs less than 50 lbs. With floats it weighs 170 lbs. After use, the floats can be deflated, refolded and used again.



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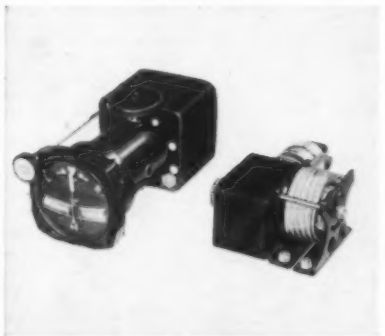
AUTOPILOT



A single-axis autopilot consisting of a turn sensing unit and an actuator connected by a single cable has been introduced by **Air Associates, Inc.**

The Dart 1 unit controls direction and rate of turn. It utilizes the sensitive gyroscope of a standard turn and bank indicator to sense and control turn rate. It weighs only 3 lbs. Price is $495, including installation kits specially designed for various aircraft.

The autopilot automatically stabilizes aircraft in straight level flight in smooth or turbulent air. Its directional stability is said to prevent the usually fatal accident known to airmen as the "Graveyard spiral." Approved by the CAA for most popular light aircraft.

Circle No. 170 on Reader Service Card.

HYDRAULIC COMPONENTS

A hydraulic components package that is said to save more than 5 lbs. per unit has been developed by **Parker Aircraft Co.**

Each package contains two check valves, a depressurizing valve, a by-pass valve, a restrictor, a filter and filter by-pass. Since six housings are eliminated and fewer lines, fittings and mounting provisions are necessary, there is considerable weight savings.

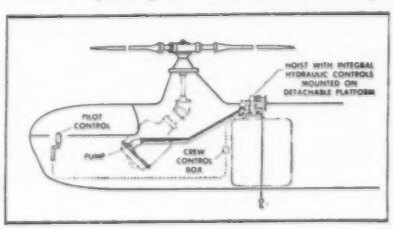
Other advantages are low installation cost, smaller space requirement and, according to the manufacturer, greater safety because fewer joints mean less potential leaks.

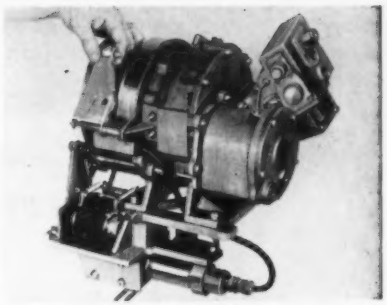
The unit was designed for the latest Boeing B-52. Similar packages are being designed for other aircraft.

Circle No. 151 on Reader Service Card.

RESCUE HOIST

A personnel rescue hoist based on a new "packaged" installation concept





has been developed by **Vickers Inc.** for airborne winch installations.

Primarily designed for helicopters, the Vickers hoist is a self-contained hydraulically-powered unit with 600-lbs. capacity. It can be installed in an aircraft in less than an hour and just as quickly removed. Only two hydraulic tubes with quick-disconnect terminals, plus electrical control switches and their wiring, are needed.

Special features of the hoist include a level wind mechanism; an anti-snarl device; an electrically actuated, cartridge-operated emergency cable-cutter; an automatic overrun control and an automatic mechanical brake.

The drawing shows the positioning of the hoist in a helicopter.

Circle No. 154 on Reader Service Card.

CANOPY SEAL

Inflatable canopy seals made of silicone rubber, developed by **The Connecticut Hard Rubber Co.** in cooperation with Douglas Aircraft's El Segundo Division, are in production and are being installed on the Navy Douglas A4D Skyhawk.

These seals are said to provide immunity to ozone and weathering deterioration and increased low temperature range. Ozone, which is encountered in many areas on the ground and is highly concentrated at altitudes from 30,000 feet up, causes organic rubber to harden, crack and split. Furthermore, organic rubber seals become stiff at —65°F, brittle below that point.

Silicone rubber units, according to the

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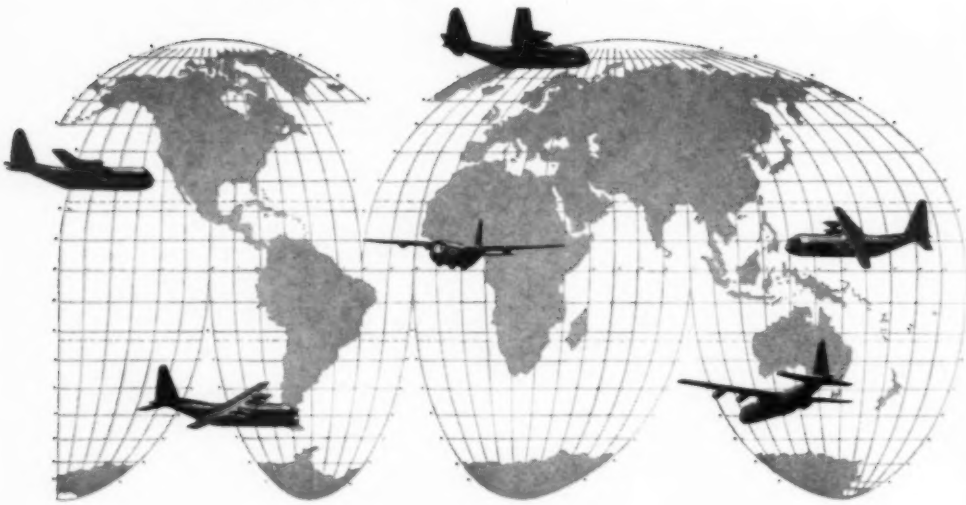
THE GO-ANYWHERE, HAUL-ANYTHING TRANSPORT–



PROPJET SPEED. With its four Allison T56 engines, the Hercules flies *faster, farther, at lower cost* than any previous combat transport.

20-TON PAYLOAD. Carries 40,000-pound load for long distances at high altitudes; with its unique push-button paradrop system, spot-drops 25,000 pounds at *one* location.

FASTER TURN-AROUNDS. Minimum loading and unloading time—fuselage floor is truck-bed height; adjustable tail ramp permits vehicles to drive aboard.

NEW MOBILITY. Takes off at 110,000 pounds in 12 times its own length; lands and takes off on improvised runways.

SIMPLIFIED MAINTENANCE. Multiple use of identical assemblies reduces spare-part requirements; easy accessibility of all components reduces service time.

AN ALL-PURPOSE CARGO, personnel and evacuation transport, the Hercules is now being manufactured in quantity at Air Force Plant No. 6, Marietta, Ga. Initial deliveries are for Tactical Air Command's 18th Air Force.

USAF's C-130 HERCULES

Today America's military services are in the aerial trucking business in a big way transporting men and supplies to bases all over the world.

Their problems and requirements vary. But whether the job is air-lifting a division to Japan, airdropping tractors or buildings at Arctic DEWline sites, or rushing missiles and fighter engines to Middle East bases, the need for mobility and versatility has never been so great.

It was for such heavy-duty hauling assignments—*of all kinds*—that America's first propjet combat transport, the Lockheed C-130 Hercules, was designed.

Specifications

Wing span, 132 feet
Length, 95 feet
Gross weight, 124,000 pounds
Cargo payload, 40,000 pounds
Troop capacity,
92 fully-equipped troops
Horsepower, 15,000
Entire fuselage pressurized
and air-conditioned.

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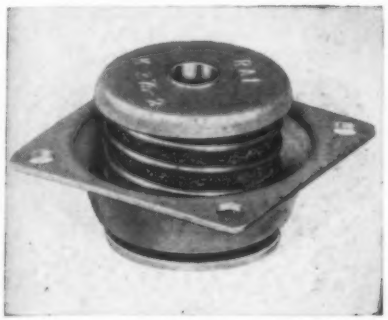
Challenging opportunities in aircraft and nuclear work are available for outstanding scientists and engineers. Inquiries invited.

NEW PRODUCTS

manufacturer, provide positive sealing of canopies with the same low air pressure over a wider range. Photo shows cockpit of the A4D with the seal installed. Inset shows cross-section of seal inflated and deflated.

Circle No. 152 on Reader Service Card.

ALL-METAL UNIT MOUNT



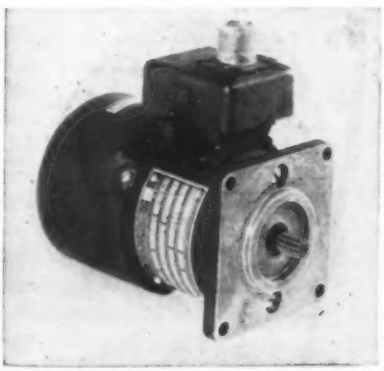
Robinson Aviation, Inc. has developed an all-metal unit mount designed to protect airborne electronic equipment against vibration.

Designated K375, the mount has a low natural frequency of 6 to 9 cycles per second and is said to be adaptable to many applications in which mounts of the AN8008-type have been used.

Vibration isolation efficiency is 90% at 30 cycles per second and is said to improve at higher frequencies. Met-L-Flex resilient cushions are made of stainless steel. They are said to be unaffected by temperature extremes, solvents, oil, sunlight and ozone.

Circle No. 153 on Reader Service Card.

PUMP MOTORS



Westinghouse Electric Corp. has announced a new line of continuous-duty explosion-proof aircraft motors (Type AK) for coolant pumps.

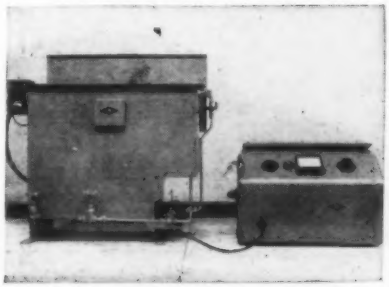
Available in ratings from 1/100 to 1/7 hp within a speed range of 2,800 to 14,000 rpm, these motors will withstand and confine within themselves an explosion of gasoline and air mixture, or equivalent.

Cooling is accomplished by an external fan that draws air through the shroud and forces it over the motor housing.

Special brushes that last 500 hours at altitudes from sea level to 50,000 feet are available.

Circle No. 155 on Reader Service Card.

ULTRASONIC DEGREASER



An ultrasonic degreaser, designed for rapid, thorough cleaning of fabricated parts in preparation for finishing or assembly, has been developed by the Industrial and Scientific Products Division of **Curtiss-Wright Corp.**

The unit measures 24 x 10 x 18 in. and can accommodate work pieces 8 x 8 x 10 in. There are two stages in the cleaning: vapor degreasing and ultrasonic solvent cleaning. Solvents such as trichlorethylene can be used.

Ultrasonic power up to 500 watts at 40 kc frequency is available over an area of 7 x 9 in. The equipment operates from a 110-volt, 60-cycle power line, consumes approximately 2,500 watts maximum.

Circle No. 156 on Reader Service Card.

PLASTIC FILM

Permacel Tape Corp., a Johnson & Johnson Company, has developed a plastic film with a solvent activated adhesive, designed primarily as an exterior marking medium for aircraft.

Designated Permacel 196, the film is said to be especially suitable for die-cutting. It conforms to military specifications for exterior decalcomanias. It may be printed by the silk screen process, or with flatbed and rotary aniline presses. Available in six colors: white, black, red, orange-yellow, insignia-blue and aluminum.

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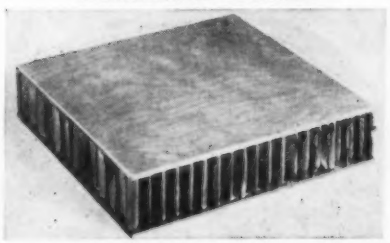
STRUCTURAL PANELS



Continental Can Co. has developed a strong, lightweight structural panel made of Kraft paper honeycomb sandwiched between Conolite plastic lam-

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1. **Stick To The Job?**...Metal-Cals are permanent, indestructible!
2. **Identify?**...Metal-Cals stay clear, sharp, easy-to-read under all conditions.
3. **Cost $$ To Apply?**...Metal-Cals slash application costs, both in labor and material—no fastening devices needed.
4. **Look Good?**...Metal-Cals come in various colors, both shiny and matte finish!
5. **Suit Your Product?**...Metal-Cals conform to any smooth surface; .003" anodized foil becomes almost a part of the product itself!
6. **Wear Well?**...Metal-Cals far outlast the best decals and litho plates!

Metal-Cal*

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NEW PRODUCTS

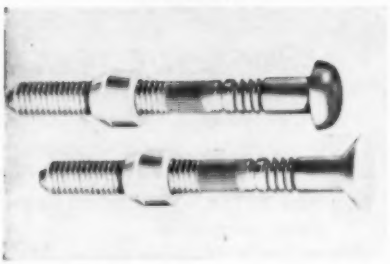
inate. The company has perfected an exclusive method for making the panels in continuous lengths, which permits seam-free application for all types of airplane interior paneling needs.

The panel is suggested for galley partitions, interior doors, storage cabinets, baggage racks, serving trays and table tops in cockpit and smoking compartments.

Surfaces are available in many colors and patterns, including wood grain, marble, dots and scrims. Conolite is said to defy stains, resist scratching, chipping or marring, and withstand boiling water, acids, greases and temperatures to 35°F. It may be cleaned easily with a damp cloth.

Circle No. 180 on Reader Service Card.

LOCKBOLTS



Lockbolts for the aircraft industry have been added to the extensive line of aircraft fasteners manufactured by the **Cherry Rivet Division of Townsend Co.**

Cherry lockbolts are said to save weight, offer a higher clinching action than rivets and more uniform clinch than bolts and nuts. Available in alloy steel and aluminum alloy, the lockbolts make possible rigid joints with high shear and tension values. They also provide an effective seal and simplify fitting-up operations.

Circle No. 181 on Reader Service Card.

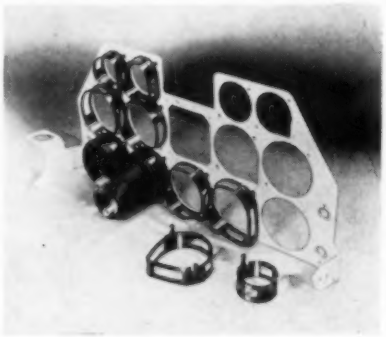
AIRCRAFT GEAR MOTOR

U.S. Electrical Motors Inc. offers an internally geared air compressor motor said to be able to withstand high shock loads.

Designated Type GA, the motor operates continually on 3-phase, 400-cycle 208-volt alternating current and has a takeoff speed of 3,700 rpm. At sea level, the motor delivers 3.5 hp. At 50,000 ft. it is 2.5 hp. Weight of the motor is 22 lbs. Technical literature is available.

Circle No. 158 on Reader Service Card.

INSTRUMENT MOUNT CLAMPS



Marman Products Co., Inc., has introduced a new line of lightweight instrument mount clamps for aircraft instrument panels.

Non-magnetic, the clamps are available in 1½-in., 2-in. and 3¼-in. sizes and fit 1/16-in. to ¼-in. instrument panels without adjustment. Special sizes and configurations are also available.

The expanded mount clamp fits behind the instrument panel. After the instrument is inserted into the panel, a cam action on the master screw tightens the clamp around the instrument, securely locking it in place.

Circle No. 174 on Reader Service Card.

TANK COATING

A gasoline-resistant coating for use inside metal or concrete storage tanks is offered by **Tankite** Industrial Finishes Division, **The H. B. Davis Co.** It is said to have demonstrated its effectiveness in 18 months of testing. The coating is laid down from an emulsion that eliminates toxicity and fire hazards of solvents.

Circle No. 160 on Reader Service Card.

IMPREGNATING SYSTEM

American Metaseal Mfg. Corp. has developed special equipment and materials that are being used to impregnate aluminum alloy castings, used in the Boeing KB-50 tanker fueling system, to insure pressure tightness.

Castings are being processed at **Hayes Aircraft Corp.** with Metaseal's Model 1-24-L impregnating system, which occupies an 8 x 11 ft. floor area. Included in the system are an impregnating tank, cleaning and rinse tanks, reservoir, vacuum pump, vapor trap, valves, gauges and pipes.

The Metaseal impregnant is based on a polyester-type resin that completely fills all metal pores and forms a solid

To the ENGINEER of high ability

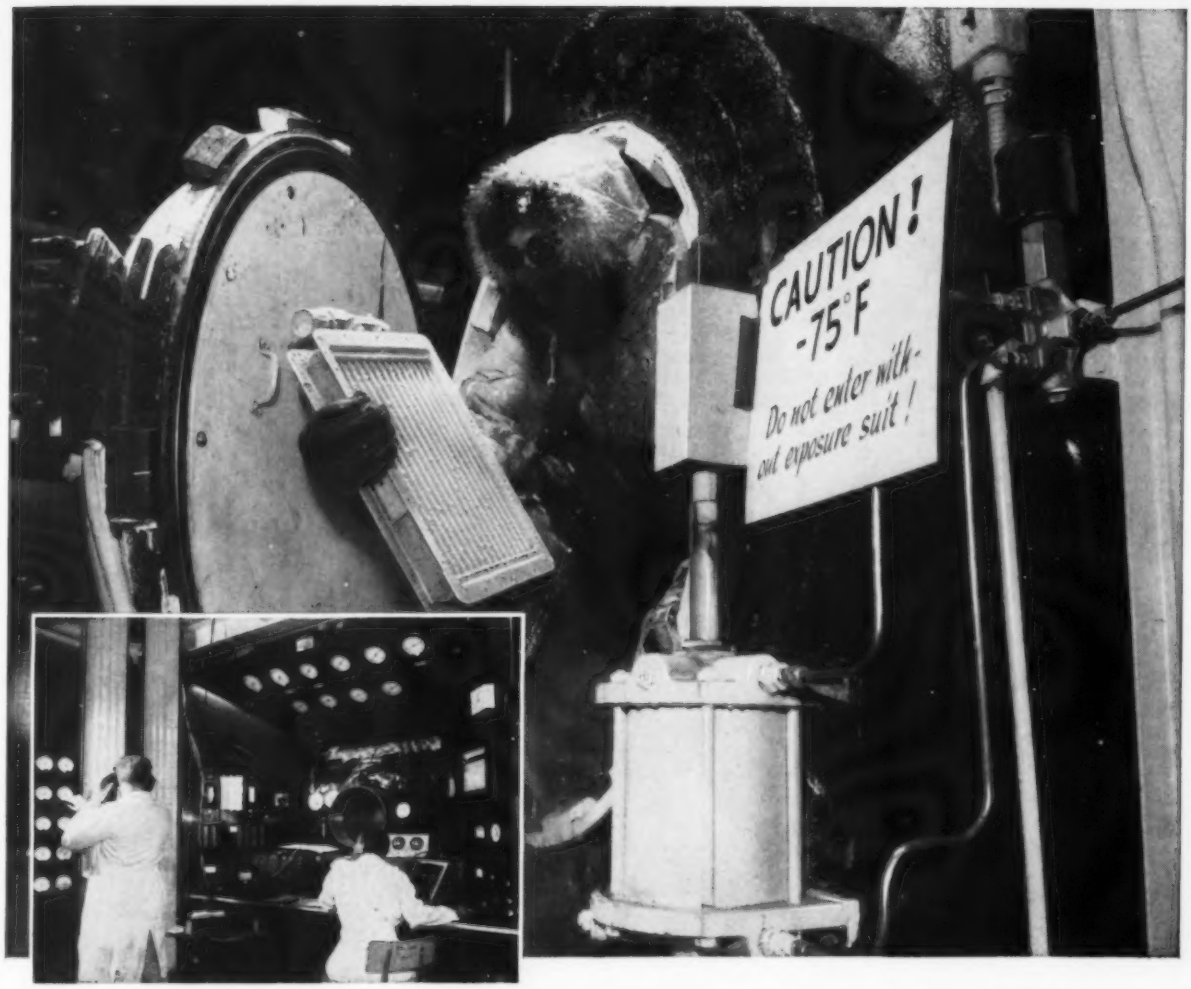
AiResearch is looking for your kind of engineer. Through the efforts of engineers like yourself our company has become a leader in many outstanding aircraft accessory fields. Among them are: air-conditioning and pressurization, heat transfer, pneumatic valves and controls, electric and electronic controls, and the rapidly expanding field of small turbomachinery. AiResearch is also applying this engineering skill to the vitally important missile accessory field.

Our engineers work on the very frontiers of present day scientific knowledge. We need your creative talents and offer you the opportunity to progress by making full use of your scientific ability. Positions are now open for aerodynamicists... mechanical engineers... physicists... specialists in engineering mechanics... electrical engineers ...electronics engineers.

For further information write today to Mr. Wayne Clifford, THE GARRETT CORPORATION 9851 S. Sepulveda Blvd., Los Angeles 45, California. Indicate your preference as to location between Los Angeles and Phoenix.

THE GARRETT CORPORATION

AiResearch Manufacturing Divisions



"Cold" facts about heat exchangers

Reliability 14 miles high is proved out in the AiResearch lab

There is no guesswork on how AiResearch heat exchangers will perform *under any conditions!* They are designed to individual customer specifications using performance data from AiResearch prototype units. Reliability of performance and system compatibility are assured by the most rigid tests.

To remove any element of chance, AiResearch has set up the finest test facilities of their kind in America. Here heat exchangers operate at temperatures over 1000° F. and at pressures over 2500 psi. They are tested for strength and performance under conditions ranging from extreme cold, as low as —100° F., to extreme heat. They are also proved out in the lab against corrosion, vibration, shock, cold soak and other environmental factors.

The thoroughness of our testing program is another reason why you can rely on the aircraft components and complete systems manufactured by AiResearch.

Qualified engineers in the fields listed below are needed now. Write for information.

THE GARRETT CORPORATION

AiResearch Manufacturing Divisions

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Designers and manufacturers of aircraft systems and components: REFRIGERATION SYSTEMS • PNEUMATIC VALVES AND CONTROLS • TEMPERATURE CONTROLS CABIN AIR COMPRESSORS • TURBINE MOTORS • GAS TURBINE ENGINES • CABIN PRESSURE CONTROLS • HEAT TRANSFER EQUIPMENT • ELECTRO-MECHANICAL EQUIPMENT • ELECTRONIC COMPUTERS AND CONTROLS

Circle No. 18 on Reader Service Card.

NEW PRODUCTS

structure. The process is applied after all machining has been completed on the castings.

Circle No. 176 on Reader Service Card.

NITRIDING STAINLESS STEEL

Development of an exclusive process for nitriding stainless steel called "Supercase" has been announced by **The Standard Steel Treating Co.** It is said to be especially adaptable for use on parts where an extremely hard surface with maximum resistance to corrosion is needed.

The process has been used successfully by manufacturers of aircraft and small parts, electronics items, transmissions and carburetors. Principle advantage is said to be the fact that it controls depths to closer limits than by other methods.

Circle No. 177 on Reader Service Card.

BONDED MATERIALS TESTER

Allen B. DuMont Laboratories, Inc. has developed an ultrasonic bond analyzer for testing adhesive bonding material without destruction. The company says the tester will remove a major obstacle blocking fullscale use of honeycomb construction in high-speed aircraft and missiles.

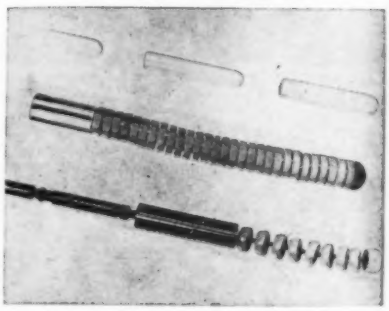
Honeycomb construction, which has important heat-resistant and strength properties, is being used, along with laminated metals, in helicopter blades as well as in some aircraft and missiles.

The Du Mont analyzer consists of a sweeping oscillator and a barium titanate transducer. It incorporates a cathode-ray oscillograph and camera. The transducer applies ultrasonic stresses to the piece being tested. Flaws in the laminate can be identified by reading the oscillograph patterns.

The equipment was developed by the Stanford Research Institute for Wright Air Development Center. It weighs 125 lbs., measures 20 x 20 x 22 in. and consumes 250 watts.

Circle No. 175 on Reader Service Card.

NYLON MANDRELS



Nylon mandrels for bending aircraft tubes are being used by **Douglas Aircraft Co.** Nylon parts were machined by **The Polymer Corp.** from Polypenco rod stock.

Polypenco nylon is said to have high tensile strength that prevents tearing of the mandrel during the bending operation. Natural resiliency of the nylon allows the mandrel to deform slightly, thereby distributing the load during the bending cycles and reducing chattering and vibration.

Three different types of mandrels used by Douglas, the bullet-type, the flexible, segmented mandrel and the flexible ball mandrel, are shown here.

Circle No. 161 on Reader Service Card.

FAULT LOCATOR

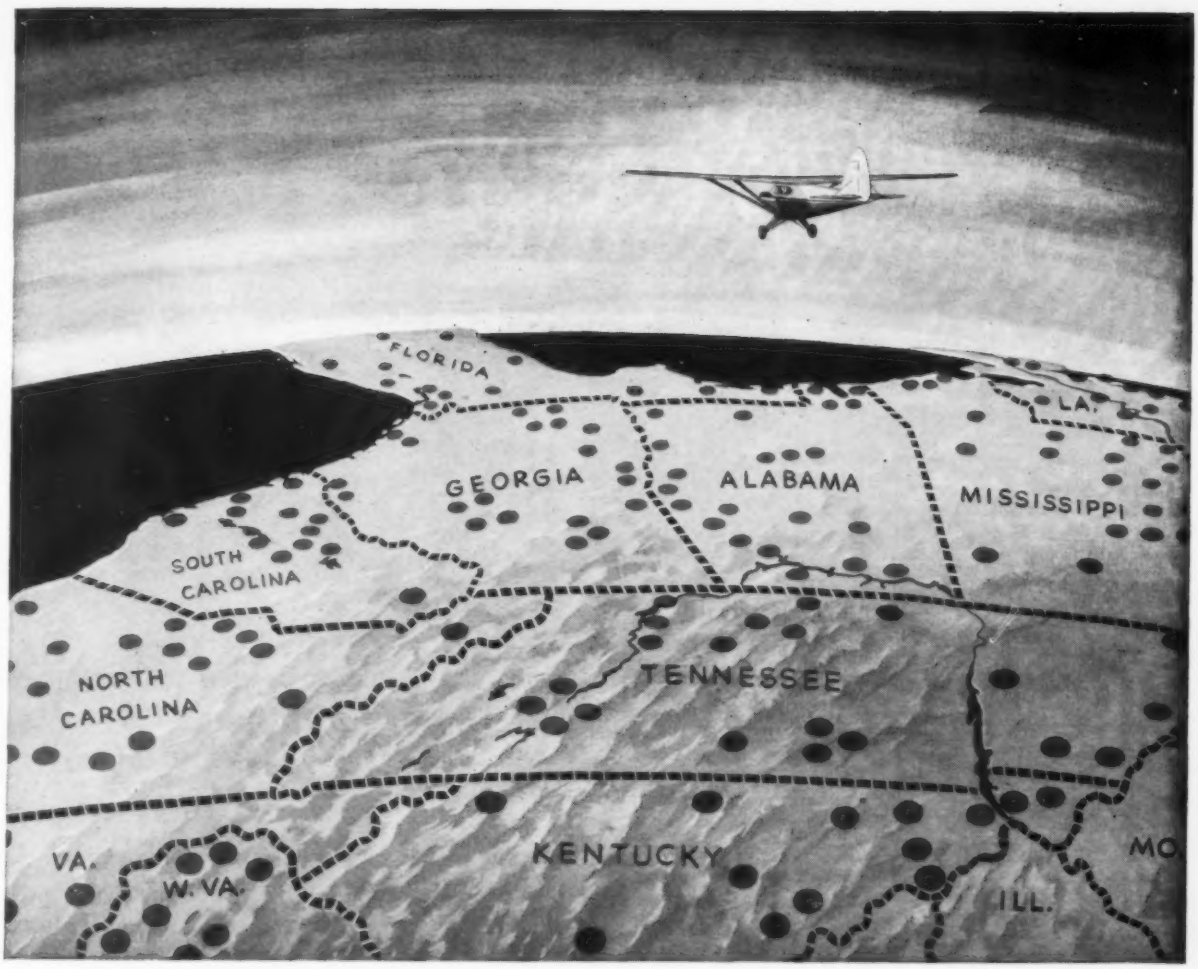
Commonwealth Engineering Co. has developed an electrical sentinel for locating points of breakdown in electrical and electronic equipment and finding such points before components fail or act erratically. The unit was developed for the U.S. Air Force.

Called a "fault locator," it sets up a comparison electrical circuit for checking against operating equipment. When this circuit varies from the set standard, the trouble is located.

According to the manufacturer, the locator can check as many as 128 reference points in ten seconds. It checks voltages, current and waveforms and is

A letter from Daddy
TO: BOBBIE PHARES
Dear Bobbie:
Okay, okay—I'll relax! I guess you're safe alright, workin' in that Missionary School, teachin' them naked little cannibals how to sing civilized songs and wear britches. If I ever hear of you pokin' your nose into that African jungle, I'm gonna aim my trusty DC-3 toward Kilimanjaro and get you back to Dallas. Your 25 years, 5'4", 112 lbs., blue eyes and black hair would make quite a tidbit for one of them outsize primeval varmints!
You're a sweet and gentle girl and I'm pleased you're devoted to The Better Things. I'm also for Better Things, with the Very Best coming from Southwest Airmotive, the business pilot's Friend for 24 years.
SAC's now opening its great new Aircraft Shop, with eye-popping changes in all directions. Here's the traditional home of Quality inspections, overhaul, electrical and prop work, and modification.
The same's true of Southwest's famous Engine Division which, while also overhauling USAF jets, has added more tooling and talent to its piston engine and accessory departments. Private owners find it bigger and better than ever.
This is the Growin'est, and the Goin'est spot in the industry. Why don't you hop over for a weekend—in the Air Age you're really not Safari far away!
Love,
Daddy
SOUTHWEST AIRMOTIVE CO. • LOVE FIELD • DALLAS, TEXAS

Circle No. 19 on Reader Service Card.



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Esso

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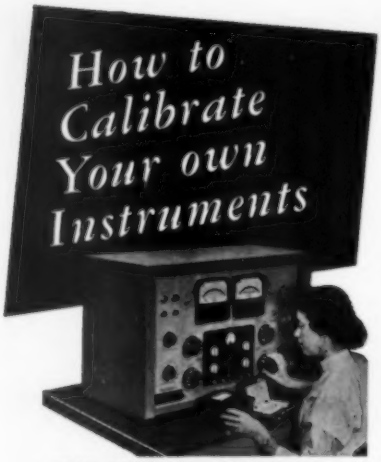
FREE TO PILOTS! *See your nearest Esso Aviation Dealer for a free Flight Sequence Card, containing everything from VHF frequencies for private pilots to traffic control light signals.*



FAST ACCURATE CALIBRATION

Now possible with one completely self-contained AC-DC calibration standard requiring a minimum of operator training and previous instrument calibration experience.

Use the Compact Model 829 INSTRUMENT CALIBRATION STANDARD for

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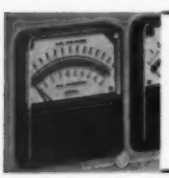
- PRODUCTION TESTING
- INSTRUMENT REPAIR
- INSPECTION & SERVICE

All Circuits, Power Supplies and Standards are contained in One Single Cabinet!

Precise, practically error-proof checking of most types of electrical indicating instruments in daily use is a routine convenience for Model 829 users. Maintenance of quality control by frequent calibration of instruments and allied test equipment can be accomplished within departments by available personnel. A mechanical index explains step-by-step test procedure.



WESTON Special Meters used as standards have 5-inch mirror precision scales, knife edge pointers and are adjusted to better than 0.2% accuracy.

Calibration to full scale accuracy of 0.5% can be accomplished for all instruments measuring d-c voltage (22 ranges) from 0.25 mv to 2000 volts, d-c current (22 ranges) from 2 μa to 20 amperes, a-c voltage (19 ranges) from 1.5 mv to 1500 volts, and a-c current (14 ranges) from 1.5 ma to 20 amperes. Net price $2345. FOB Boonton, N.J.

Write for Technical and Application Data.

Radio Frequency LABORATORIES, INC.
Boonton, New Jersey, U. S. A.

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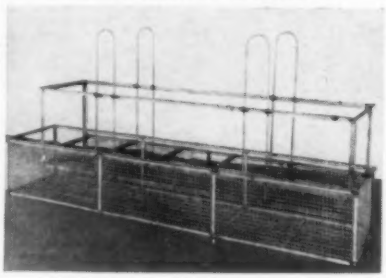
NEW PRODUCTS

said to have unlimited possibilities for checking all types of equipment.

Circle No. 178 on Reader Service Card.

DEGREASING BASKET



A degreasing basket manufactured by the Wiretex Manufacturing Co. is designed to hold heavy extra-long parts, such as aircraft frames and shafts.

The basket is nested in a frame, enabling the largest possible surface area of each part to be exposed for draining or cleaning. Loading and unloading is said to be very easy.

The frame is 11 ft. long, 29 in. wide and 33 in. deep, while the basket measures 10 ft. 6 in. by 26 in. by 20 in. The frame is stainless steel, the basket mesh is .120-diameter wire. Top, bottom and corner angles of the basket are of stainless steel.

Circle No. 162 on Reader Service Card.

POCKET COMPUTER

A pocket computer that is said to solve navigational problems with fewer steps than other computers has been placed on the market by **Warner Instrument & Sales Co.**

The Warner E-1 computer has no limitations on wind speeds, air speeds or ground speeds and is thus suitable for jet plane operation. It has sine scales to solve wind vector and other problems. On a high velocity wind vector problem, it will solve the problem with one setting, three readings and two scales.

A 48-page instruction booklet is provided with the computer.

Circle No. 190 on Reader Service Card.

BERYLLIUM COPPER CONTACTS

Beryllium copper is being used as a contact material in printed circuit connectors, according to the **Beryllium Corp.**, because fatigue resistance is two or three times that of other spring-type copper materials, such as spring brass or phosphor bronze.

Where connectors are used for insertion or removal or printed circuit cars, a beryllium copper alloy is said to assure positive contact up to 1,000 or more insertions. H. H. Buggie, Inc. last year used over 6,000,000 beryllium copper contacts in connectors supplied to users of printed circuits. Applications include radar, radio, guided missiles, computers, telephone equipment and television.

Circle No. 172 on Reader Service Card.

COIL WINDER

A new coil winder with a time-saving instant re-settable wire guide has been announced by **George Stevens Mfg. Co., Inc.** Two winding speeds used are 0-800 and 0-1600 rpm, and the unit has a winding range from 44 to 3,040 turns per inch.

Maximum distance between winding centers is 15 inches, and the winder is used to make precision linear potentiometers, space-wound resistors and distributed constant delay lines up to 12 inches long and up to 4 inches in diameter. Wire sizes from 0.0007 to 20-gauge can be wound. The winder features positive stopping by means of a magnetic brake.

Circle No. 163 on Reader Service Card.

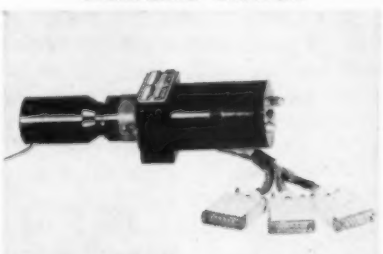
MAGNETIC AMPLIFIER RELAY

A miniature magnetic amplifier relay that weighs only 6 oz. and is said to be extremely sensitive and vibration-resistant has been developed by **The Liquidometer Corp.**

Designed for use in guided missiles, airborne computers and circuits employing photocells, transistors or thermistors, the relay fits in an envelope measuring 1¼ x 2¾ in. It has a sensitivity of 80 microwatts for a zero-to-5,000-ohm resistance source, decreasing to 100 microwatts for a 15,000-ohm source. Technical literature (bulletin No. 562) is available.

Circle No. 164 on Reader Service Card.

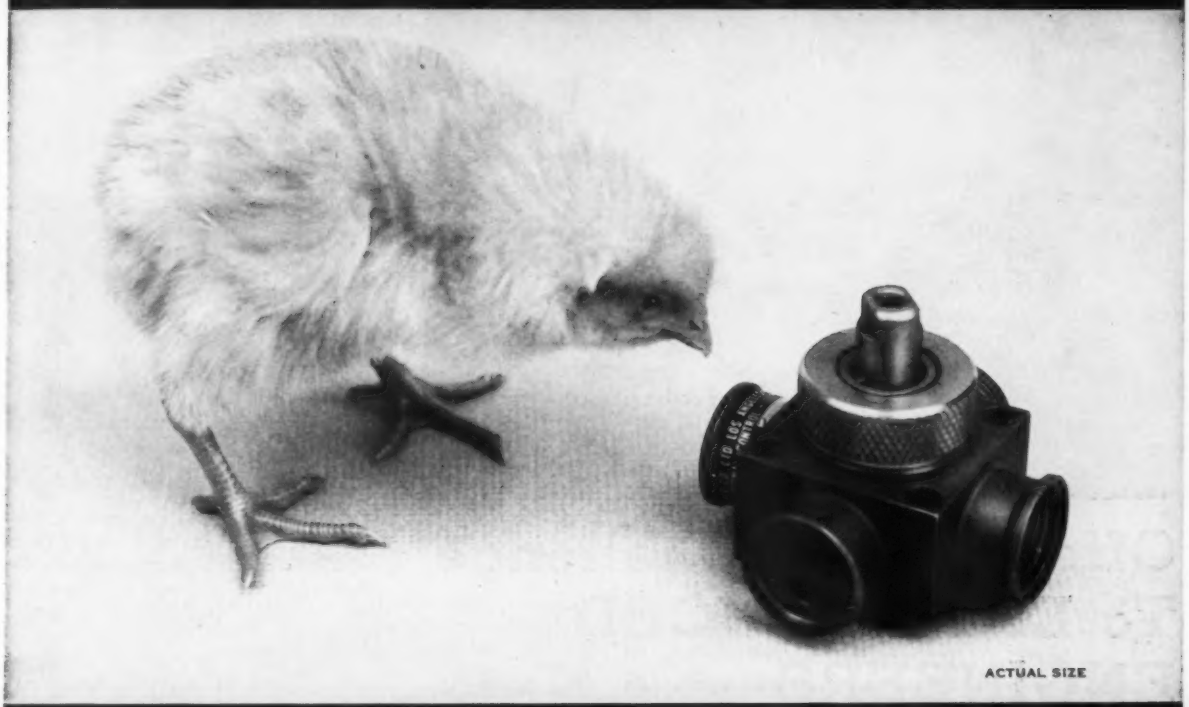
SAMPLING SWITCH



A motor-driven sampling switch, which has 20, 30, 40 or 45 contacts per pole, and one to four or more poles, is offered by **General Devices, Inc.** Direct

MINIATURIZED MARVEL

that does a giant-size valve's job!



ACTUAL SIZE

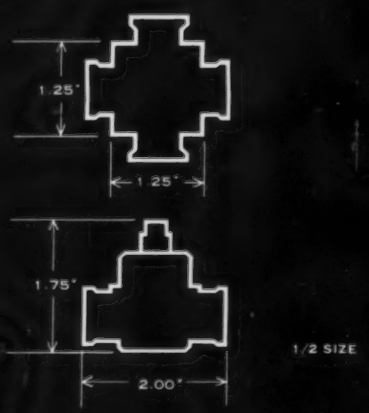
It's called "Select-O-Mite"— and it's actually only half the size and weight of the average manually operated selector valve.

Here—in this tiny stainless steel envelope weighing but four-tenths of a pound—is a minute valve in which over 90 combinations of operating characteristics can be provided. Flow patterns are available in four-way, three-position; three-way, three-position; or three-way, two-position.

Sealing action, combining lapped surfaces and extremely close fits between plug and body, limits leakage to AN specification (or less) in hydraulic fluid up to 3000 PSI pressure, and to approximately one cubic centimeter per minute air leakage between 1000 and 3000 PSI in pneumatic systems.

This revolutionary new design is available in tube sizes of 1/4", 3/8" and 1/2"—with stops optional at both extremes of travel, and detents as desired at any position. Many handle configurations can be provided.

Certain standard versions are now being stocked as shelf items. Ask your Whittaker Field Engineer about them.



Whittaker

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NEW PRODUCTS

current, 60 or 40-cycle ac integral motor is optional.

A Perma Brush wiper mechanism affords up to 500 hours of life without servicing. Approximate size of the switch is 1½ x 1½ x 6⅞ in. Models available include single- or multiple-pole, stacked, concentric, opposed, raised contact, segmented or printed circuit designs. Literature is available.

Circle No. 179 on Reader Service Card.

THREAD-ON CAPS

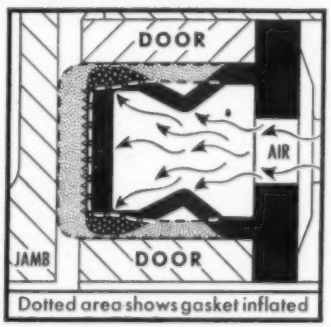
Insulating caps for aircraft wire ends that can be threaded on by finger are offered by The Thomas & Betts Co. Made of nylon, the caps are chemically inert to fluids encountered in aircraft systems.

The cap is threaded on unstripped ends of extra and unused pigtail leads with a few motions. The threaded cap bites into the wire insulation to form a tight protective seal that holds despite severe vibration.

Color coding of the caps facilitates installation. Available in sizes for #20-#16 wires.

Circle No. 171 on Reader Service Card.

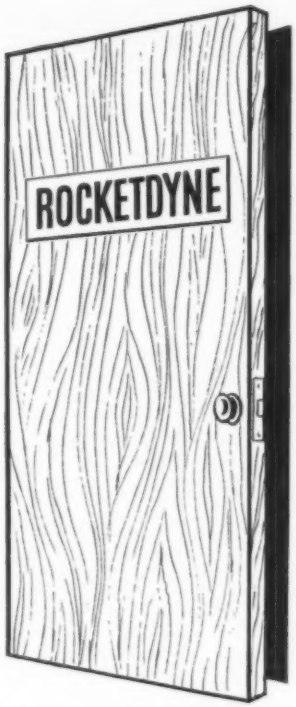
PNEUMATIC RUBBER GASKET



Continental Rubber Works has developed a pneumatic rubber gasket for use on the doors of a jet engine test cell. When inflated to approximately 30 lbs. air pressure per sq. in., the gasket expands proportionately insuring a positive seal over the entire surface, including the corners. Noise outside the test cell is thereby dampened.

The section shown can be made into a rectangular gasket of any size.

Circle No. 182 on Reader Service Card.



What engineers find behind this door

In the past ten years, hundreds of engineers and scientists have opened this door. To a man, they'll tell you that they are impressed by the challenging, fascinating work – advanced rocket engine development, design and testing.

Daily, engineers find that their job at ROCKETDYNE is a big and important one... concerned with all phases of the rocket engine business... a demanding job, with personal and professional rewards that equal or exceed the demands.

You can find all this—and more: new rocket engines, pumps and powerful turbines, designed to meet the rugged requirements of space flight.

You can open this door to a number of exciting, different fields, one of which will fit your training or experience. You needn't have worked directly in rocket engines or other propulsion systems before. Experience or training in other engineering fields can qualify you for a position at ROCKETDYNE. Listed below are some examples.

Aeronautical Engineers:

PRELIMINARY DESIGN. Opportunity to conceive, analyze, and evaluate highly advanced concepts in large, liquid-propellant rocket engines, advanced propellants, feed systems, principal components and parameters. Advanced military proposals. Market studies. Operations Research and long-range programming. Advanced degrees preferred.

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COMBUSTION DEVICES. Important professional growth opportunities for engineers heavy on thermodynamic and heat transfer background, as it may pertain to high temperature, high stress components such as thrust chambers, gas generators, injectors, and heat exchangers. Unusual challenges available in work on high-rate heat transfer, pyrotechnics, spark-initiated and hypergolic ignition, combustion mechanics, droplet formation and flame propagation.

ENGINE DEVELOPMENT. Opportunities for research engineers at the focal point of intensive activity associated with engine testing and data evaluation. Involves the design of experiments, specification of test methods and procedures, including instrumentation, as well as the processing and evaluation of data. Problems and studies encountered fall into all branches of engineering, and the ability to comprehend highly complex systems, engines and engine programs is of paramount importance.

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My name is _____

Home Address _____

I have a _____ degree from _____

And _____ years actual engineering experience

I am
I am not enclosing a resume

People

MANUFACTURING

Brig. Gen. Lance Call (USAF, ret.) elected v.p. of Kellett Aircraft Corp.

Clarence L. Johnson appointed v.p. for research and development, Lockheed Aircraft Corp.; **W. R. Rhoads** appointed director of the Georgia nuclear aircraft test laboratories.

John W. McGuyrt made mgr. of Chance Vought Aircraft's new flight operations department.

Dr. Erwin O. A. Naumann named chief of advanced studies in Solar Aircraft Co.'s engineering division.

John L. "Len" Whiteman appointed mgr. technical adv. and data department, Jack & Heintz, Inc.

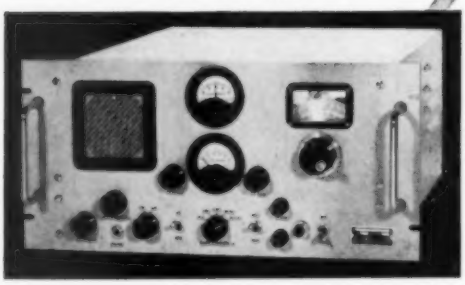
Leslie L. Aspelin named engineering mgr. for Thompson Products, Inc.; **Dr. John D. Stanitz** chief engineer of the accessories division; **R. T. Hall** sales mgr. of the division.

Charles H. Hurkamp joined Fairchild Aircraft Division as chief of advanced design; **Randell C. Smith** becomes chief of technical engineering.

Sam F. Arn named mgr. of sales and contracts for LearCal Division of Lear, Inc.; **Vernon B. Benfer** appointed gen. mgr. of the Aircraft Engineering Division.

Walter L. Flinn heads Vickers Inc.'s new Washington office.

NEMS-CLARKE
TYPE 1501



Special Purpose
RECEIVER
for
UNEQUALED
PERFORMANCE
in

- TELEMETERING
- GUIDED-MISSILE MONITORING
- RADIOSONDE RECEPTION

The Type 1501 Special Purpose Receiver is now being offered as the improved version of the NEMS-CLARKE 167-J1 and 167-J2. The all new 1501 receiver incorporates the best qualities of both of the former types plus many new features including a BFO. A video bandwidth control is provided to greatly improve signal-to-noise ratio when full bandwidth is not needed.

NEMS-CLARKE Type 1501 receiver is useful in application in telemetering, guided missile monitoring, radiosonde reception and as a high quality general purpose laboratory AM/FM receiver where superior performance is desired in the frequency range of 55–260 mcs.

Write Dept. H-9 for further information

NEMS-CLARKE
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T. A. Knowles named president of Goodyear Aircraft Corp.; **Val L. Follo** named v.p.-production.

Knowles

Hughes Aircraft Co. announced the following promotions: **Howard P. Hall** to v.p., secy. and gen. counsel; **William W. Wooldridge** to v.p.-administration; **Roy E. Wendahl** to mgr. of the Tucson plant; **John H. Richardson** to director of military sales.

L. Steward Mims appointed head of nuclear engineering department, Bell Aircraft Corp.

Lee Renshaw, elected vice president of California Aviation Service, Inc.

Walker M. Mahurin appointed mgr. of military relations department at Northrop Aircraft, Inc.

Donald S. Conrad made chief installation engineer at Pratt & Whitney Aircraft.

J. F. 'Skeets' Coleman, noted test pilot, joined the customer relations staff of the Fairchild Engine and Airplane Corp.

AIRLINE

David E. Midgley appointed gen. traffic mgr. and **Henry Fellows** appointed gen. mgr., sales research, for Trans World Airlines.

William D. Ferguson named mgr. of personnel relations and development in the sales administration of United Air Lines; **John J. Dierssen** appointed to newly created post of mgr. of sales incentives.

Dierssen

George R. Davis made director of maintenance for Bonanza Air Lines.

Capt. John E. (Andy) Anderson appointed asst. chief check pilot of Pan American's Pacific-Alaska division.

Shelby W. Merrill resigned as gen. sales mgr. of Air Express International.

GOVERNMENT AND MILITARY

Rear Adm. John S. Sides named deputy to the Pentagon's new guided missiles czar, Eger V. Murphree.

Edward E. Slattery, Jr., goes from Chief of Public Information Section, Office of Congressional Liaison and Public Information, CAB, to the Hearings and Reports Division of the Board's Bureau of Safety Investigation.

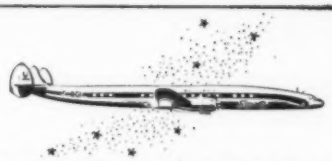
Prof. Courtland D. Perkins of Princeton succeeds **Dr. H. Guyford Stever** as Chief Scientist of the U.S. Air Force.

George Rand, chief of CAA's Airways Operations Div., goes to Oklahoma City as deputy dir. of the Aeronautical Center, replacing **Allan Horning,** who becomes program advisor to the regional administrator in Los Angeles.

Brig. Gen. Troup Miller, Jr., commander of the Northern Air Materiel Area in Europe, succeeds **Maj. Gen. Samuel Harris** (retiring) as commander of the Arnold Engineering Development Center effective July 25.

The Men Who Are Air France

NO. 1 OF A SERIES



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A Senior Air France Captain

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20,000 hours of flight over a period of 28 years makes a man feel at home in the sky. And that's the proud record, unmarred by incident, of Captain J. Hennequin of Air France.

His long career in aviation is highlighted by service with the pioneer, Maurice Noguès, inaugurator of the first France-Far Eastern service; the development of a Calculation Law for Aerial Navigation; and aviation survey work in many far corners of the world.

He has made more than 150 transatlantic crossings, over 210 flights to the Far East. Today he is one of Air France's most active pilots . . . an outstanding representative of the men who have built the Air France record of 37 years of service to the people of 73 countries.

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THE WORLD'S LARGEST AIRLINE WITH 155,000 UNDUPLICATED ROUTE MILES

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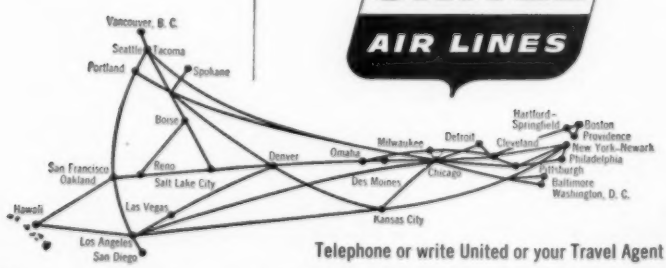

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West Coast Talk . . . By Fred S. Hunter

- **F-104A is pilot's dream, says Tony LeVier.**
- **Northrop comes to rescue of Lockheed.**

A FEW NOTES on the first of the Mach 2 airplanes, Lockheed's fabulous F104A—It's a pilot's dream, says Tony LeVier. Test pilots, as a rule, are high on new aircraft they fly—except when they're talking to the engine manufacturer, in which event there invariably are shortcomings in the power. But Tony is a candid soul, and when he says an airplane flies good, it does . . . The F-104 goes into the record as a personal triumph for "Kelly" Johnson, No. 1 champion of the straight, thin wing principle for high speeds. Thus it seems fitting Lockheed upped Kelly to v.p. of research and development for all divisions at about the same time the F-104 was being unveiled.

Hunter

We've heard it said the F-104's is a 3.4% wing. A Gillette razor blade is 1.46%. So you see why a Life photographer appeared at Palmdale with a basket of vegetables to slice into a salad to illustrate how sharp the leading edge is . . . The wing has leading edge and trailing edge flaps, and pilots say you can land it about any way you want. Normal landing speed is 135 knots, or just a shade faster than the Convair delta-wing F-102's 130 knots . . . An overcast at 30,000 feet spoiled some of Lockheed's plans at the Palmdale demonstration, but not Tony LeVier's wit. Herman Salmon, in setting up for a pass over the field with the F-104A, radioed his position to LeVier as over the ocean. "Which ocean, Herman?" cracked the irrepressible LeVier.

The big press delegation and other guests at the ceremonies taxed the capacity of Lockheed's cafeteria at Palmdale, so President Robert E. Gross and other Lockheed officials had to lunch at Northrop's cafeteria across the field. But Northrop was glad to welcome them. Gross and Whitley Collins, Northrop president, are business rivals, but old friends. Back in the early days, Collins was vice president and general manager of Lockheed . . . And now that we have the F-102A moving along, what's the next Mach 2 aircraft? How about North American's F-107?

* *

It will be interesting to observe whether the new Systems Research Corp., formed by a group of scientists who quit the Missile Systems division of Lockheed in a dispute over company policy, will turn out to be as successful as the Ramo-Wooldridge Corp., which was formed under like circumstances in a defection from the Hughes Aircraft Co. Progress by Ramo-Wooldridge has been phenomenal. You don't often see a young, new company attain such responsibility as Ramo-Wooldridge has in becoming the high-level engineering and scientific overseer of the Air Force's critical ICBM program, including both the Convair Atlas and the Martin Titan.

* *

American Airlines will soon have a ticket office on one of the most famous corners in the world, Hollywood and Vine. Here's where 40,000 tourists pass each day. Another asset: a sign hung on the wall of the Taft building spelling out American Airlines in letters eight feet high . . . United Air Lines plans a mobile galley for its DC-8s.

It will be loaded—and unloaded—in the commissary and the whole works hoisted into the airplane in a single operation; no running up and down the ramp with containers, vacuum jugs, etc.

* *

Protests over the Air Force's dispersal policy have completely disappeared from the Los Angeles papers. The Chamber of Commerce, which launched the campaign, seems to have lost its sparkplug when Clyde Barnett quit as chief of its aviation department to become state aeronautics director up in Sacramento. Or maybe it's because this is election year. Meanwhile, dispersal goes on.

* *

It's really a little incredible that airlines have been able to maintain fare levels and increase profits in the face of increased costs.

For example, airline cost of a P&W R-2800-CB16 engine, standard power plant for the DC-6 and Convair lines, originally was $27,000. Today's price tag is $48,200.

SKIN PANEL ALLOWABLES INCREASED WITH 75 ST *hi-shears*

75ST HI-SHEAR rivets combat "head popping" and wrinkles in skin panels more effectively than 24ST DD rivets. Combining higher material strength and close tolerance heads, the 75ST HI-SHEARS permit higher shear and tension allowables, reduce shop problems and improve surface flushness.

HS25 rivets with the AN426 styled head permits countersinking in skin minimum thickness of .072 or more. Hole preparation is accomplished with same standard tools.

HS23 with the small HI-SHEAR styled head permits countersinking in thin gauges (.051 min.) and eliminates sub-countersinking or sub-dimpling in frame-to-skin attachments, extrusions, stainless steel, titanium or where dimpling clearances are lacking.

HS26 with a flat head attaches thin sheets where bearing is critical. Reduced by ⅔rds the weight of a steel fastener.

- 75 ST HI-SHEARS drive with ½ the force of DD rivets and eliminate "ice-boxing" DD rivets.
- 75ST HI-SHEARS use the same standard Sets as used in driving steel HI-SHEARS.
- 75ST rivet pin uses an A17ST HS24 collar (dyed blue).

WRITE for the HI-SHEAR Standards Manual.

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Salute to America's global "keepers of the peace"!

At this very moment, miles above the earth, dedicated crews of the Strategic Air Command are boring through silent space on precision, combat-ready training missions. Some are high over a polar icecap, or far out over the oceans. Other SAC crews, and their jet bombers, are poised on American and overseas bases, ready for instant action.

At any moment, day or night, SAC's training operations can be changed into combat operations, unleashing mighty retaliatory nuclear strikes against the war-making power of any aggressor, anywhere.

As the potential wielder of this massive force, Strategic Air Command has, since its founding ten years ago, functioned as the free world's "keeper of the peace."

To maintain this great force on the keenest edge of readiness, SAC crews—ground and flight—operate around the clock on a combat alert basis. Flights and missions follow split-second timetables. Entire wings, accompanied by aerial freighters and tankers, are rotated in regular training operations to bases in England and North Africa.

Last year, Strategic Air Command's keepers of the peace flew over 100,000 individual missions, totaling more than 1,000,000 hours of flying time.

On this 10th anniversary of the founding of SAC, the men and women of Boeing join a grateful nation in saluting the men of the Strategic Air Command. Boeing is proud that, over the decade, it has been privileged to work as a partner, designing and building SAC's tankers and bombardment aircraft. The Strategic Air Command's Boeings range from its first B-29s and B-50s to today's rugged KC-97 tankers, swift six-jet B-47 medium bombers, the eight-jet B-52 intercontinental bombers and the KC-135 jet tanker-transport now under construction.

BOEING

International Aviation

By Anthony Vandyk

Instead of competing, road, rail and air have got together in Europe to provide one of the most unusual transportation services ever conceived. Known as the Silver Arrow, the new service links London with Paris by a combination of three different modes of transportation.

Not only does it provide a quicker journey than any other means of transport between the two capitals, except the direct inter-city flights of Air France and British European Airways, but it is available at fares lower than those for the conventional rail-sea-rail trip in third-class accommodations.

The Silver Arrow service is provided by two independent airlines—Britain's Silver City Airways and France's Compagnie Air Transport and the French National Railways. This is the way it works: Passengers travel from the center of London to Ferryfield airport, on the southeast tip of the English coast, in a forty-seat bus painted in special Silver Arrow colors.

After the three-hour road journey they transfer to a Bristol 170 of Silver City Airways which flies them in 20 minutes to the French airport of Le Touquet. At the nearby railroad station of Etaples the passengers board a 60-passenger diesel-powered railcar which makes the run to the Gare du Nord in the center of Paris in 140 minutes at an average speed of 65 mph. The total elapsed time from city center to city center is 6 hours, 50 minutes.

Another interesting low-fare combination air/surface service between London and Paris was recently started by Skyways of London. In this operation passengers are taken by bus to Lympne airport, also on the southeast tip of England, and continue in a DC-3 to Beauvais, an hour's flight. From Beauvais another special bus takes them to Paris in 2½ hours. Total elapsed time is slightly less than on the Silver Arrow, about 6½ hours. The success of the Skyways service is such that frequency has been stepped up to six round trips daily. A seventh will be added in July.

France Builds Up Military Air Power

A status report on the French Air Force's build-up shows that Dassault has delivered about 140 of the 325 Mystere IVA fighters ordered as well as 50 of an order for 150 Mystere IIs. The latter order will be completed this year and in 1957 Dassault will start delivering 375 Mystere IVBs.

The French Air Force's Dassault Ouragan straight-wing jet fighters are being fitted with a new main gear to make them suitable for operation from grass fields. In their new form they will be known as Barougans.

In a few weeks SNCA du Sud-Ouest will deliver the first of a production order of 140 Vautour all-weather fighters and this quantity will soon be increased by 210 aircraft. The 160-plane order for the SNCA du Nord 2501 Noratlas transport is being increased by 40. About 100 have been delivered to date. A firm order for 15 Breguet 965 Deux Ponts heavy transports has been placed for delivery starting in 1958.

Orders for the Max Holste Broussard light transport have been increased from 198 to 310 aircraft. Deliveries have just started, as have those of the Fouga 170 Magister. The French government has stepped up its order for this jet trainer from 95 to 365 aircraft including 30 for the Navy.

Delivery of another light jet aircraft, the Morane Saulnier, will begin at the end of 1957. The Air Force will get 50, the Navy 19. Morane Saulnier has delivered about 80 of the 130 Model 733 piston-engine trainers on order. SNCA du Sud-Est is completing an order for 94 Aquilons for the Navy. The Aquilon is basically a DH Sea Venom built under license by the French company.

SNCASE is building 100 3130 Alouette helicopters for the Air Force, 60 for the Army and 23 for the Navy. Deliveries are currently starting. SNCASO is producing 60 lightweight Djinn helicopters for the Navy and should have delivered 35 by the end of the year.

TRANSPORT BRIEFS

Aer Lingus has ordered four Fokker F-27 Friendships while **Trans-Australia Airlines** has contracted to buy six of the Dutch turboprop transports for delivery in 1959. . . . **Indian Airlines** is seeking government approval to buy five more Viscounts and to dispose of its six DC-4s and 12 Vikings. It already has five Viscounts on order and currently operates 67 DC-3s and eight Herons in addition to the DC-4s and Vikings . . . **Alitalia** has decided to order some DC-8s for 1960 delivery. Late in 1957 the Italian airline will introduce DC-7C equipment on its routes to South America and South Africa . . . **Aerolineas Argentinas** has been transferred from the jurisdiction of the Ministry of Transport to the Ministry of Aeronautics.

MILITARY BRIEFS

France has four guided missiles operational—the Arsenal 5201 (ground-to-ground), Arsenal 5210 (ground-to-ground and air-to-ground), SPEC MAS 5103 (air-to-air) and CT.10 (drone). **Israel** has received 12 Dassault Mystere fighters and is now trying to buy 35 Canadair Orenda-powered F-86s. It is also interested in the Folland Gnat . . . **Germany's** Navy is to be equipped with Hawker Sea Hawk fighters . . . **South African Air Force** has ordered three S-55 helicopters for rescue work.

Viscounts with High-Solidity Props

De Havilland high-solidity propellers for tropical use are installed on Central African Airways' Viscounts now being delivered. Square-tipped blades are activated on hydromatic principle with ground and air fine pitch stop positions. All other Viscount customers have specified Rotol propellers.

EXHAUSTIVE TESTS on the General Electric T58 turboshaft engine have been conducted to prove its basic design and to assure top performance and reliability. Results show that the advanced design features of the T58 promise vastly improved helicopter performance.
GENERAL ELECTRIC

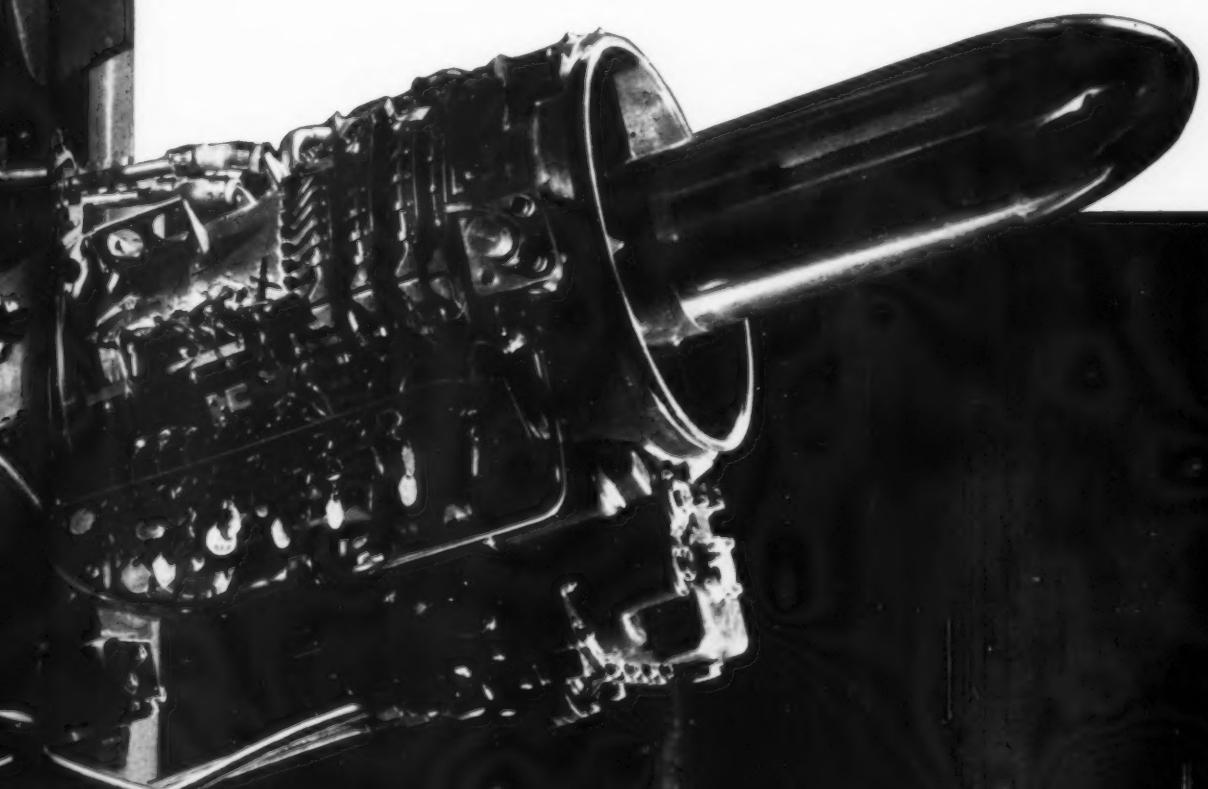
Tests on G.E.'s New T58 Engine Point to Major Advance in Helicopter Flight

General Electric's T58 turboshaft engine, now on test for the U.S. Navy Bureau of Aeronautics, represents a significant step forward in the art of small aircraft gas turbine design.

Incorporating many advanced engine-design features, the T58 introduces to the 1000-horsepower class a turboshaft engine with **low specific fuel consumption** and an **outstanding power-to-weight ratio**—advantages that truly forecast greater helicopter and fixed-wing aircraft performance.

The T58 also introduces a new concept in **constant-speed control** that provides a standard of operation unapproached till now. Designed to take full advantage of a free power turbine, this new control permits operation of the helicopter's rotor at its maximum efficiency and eliminates the need for speed adjustment by the pilot during normal helicopter operation.

These are only a few of the features that make the T58 the ideal helicopter powerplant and another example of General Electric's ability to design and build for tomorrow's aviation needs. With fifteen years of experience in producing aircraft gas turbines of the highest reliability and quality, G.E. continues to set such standards as proof of its role in the progress of American aviation. Section 233-1, General Electric Co., Schenectady 5, N. Y.



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Temco's new Model 51

A primary trainer

with true jet performance

The Temco Model 51 is a *completely new* primary jet trainer with true jet performance. Developed and financed entirely by Temco, it is as advanced as the jet age for which it was designed.

A two-place, tandem, mid-wing plane of simple, light-weight low-cost design, it is rugged and reliable throughout. It has a maximum level flight speed at least 50 mph faster than the quoted performance of any other fully equipped single-jet primary trainer.

Simple and safe enough for a student pilot's first solo, it still incorporates a host of operational jet aircraft systems including among others ejection seats, liquid oxygen and hydraulic speed brakes. In design and performance, the Model 51 has been engineered without compromise to meet the jet age requirements of military training commands.

FACTS ABOUT THE TEMCO MODEL 51 JET TRAINER

Engine	Continental YJ-69-T-9 turbo-jet
Gross Weight	4,137 pounds
Total Capacity	165 gallons
Ultimate Load	11.25 Gs
Maximum Dive Speed	450 knots
Maximum Speed (15,000 ft.)	300 knots
Cruise Speed (25,000 ft.)	215 knots
Stall Speed	60 knots
Service Ceiling	35,000 ft.
Rate of Climb	1,900 ft./min.

TEMCO

AIRCRAFT CORPORATION, DALLAS

Lightplane Liability Law Proposed

A financial responsibility bill for business and private aircraft has been introduced in the House of Representatives by Congressman Herbert Zelenko (D-N.Y.).

The proposed legislation would amend the Civil Aeronautics Act to require that "no civilian aircraft should be operated within the territorial limits of the U.S., unless the owner thereof has given proof of his ability to respond in damages in such amounts as the Board shall prescribe, for the death or injury to any persons or damage to property resulting from the operation of such aircraft for which the owner thereof may be liable."

"Many thousands of our citizens have been maimed and killed," Rep. Zelenko said, "and their property destroyed in accidents involving the use of privately-owned airplanes. Adequate compensation for such damage has not been forthcoming due to the fact that many private owners of such aircraft are not financially responsible. This has resulted in economic privation and permanent suffering of the victims of these accidents who have found themselves with uncollectable judgments or claims."

Noting that the airlines have "adequately protected the public" in this regard, Zelenko asserted that "the rise in the number of privately-owned civilian aircraft with its concurrent rise in accidents have caused a problem somewhat similar, although smaller, to that involving the use and operation of automobiles."

New Cessna 182 Has Tricycle Landing Gear

Latest addition to the Cessna air fleet line is the Model 182, the second in a series of tricycle single-engine planes announced this year.

Powered by a 230-hp Continental engine, the four-place business plane cruises at 70% power and 7,500 feet at more than 150 mph. Top speed is about 160 mph.

The Model 182 features Cessna's new Land-O-Matic tricycle gear, first introduced last November on the smaller Model 172. The new model is priced at $13,750 F.A.F. Wichita.

Helio Courier Features Increased Speed, Range

Helio Aircraft Corp. has announced its 1956 model of the Helio Courier. Aerodynamic refinements have increased speed by ten miles an hour and range to 745 miles. Powered by the 260-hp Lycoming engine as heretofore, the plane now cruises at 167 mph @ 70% power with an optimum cruise of 157 mph @ 60% power.

Refinements included redesign of the windshield, among other improvements. Cabin is said to be quieter.

Lynn L. Bollinger, president, has reported that since production began last August, 28 of the four-place single-engine aircraft have been delivered. The plane currently is manufactured at the Mid-States Manufacturing Co. plant in Pittsburg, Kansas.

Aero Commander 680 In Full Production

Aero Design & Engineering Co. has announced full production on its Supercharged Aero Commander 680, First of the series was delivered to the Long Manufacturing Co. of Tarboro, N.C., followed by deliveries to Stonnell and Holladay Aircraft Sales of Arlington, Va.; International Business Machines Corp., and to Reading Aviation Service for final delivery to the Lone Star Cement Co.

The 680, to be produced side by side with the 560A, is the first of the small twins to use two supercharged 340-hp Lycoming engines. Top speed is 260 mph with a 230-mph cruise. A 223-gallon fuel capacity allows a maximum range of more than 1,600 miles with a useful load of 2,670 lbs. Cabin comes in five- to seven-passenger configurations.

Business Flying Briefs

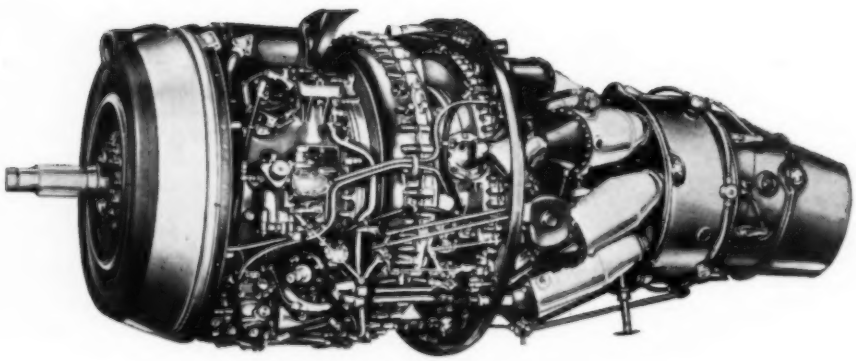
• **Newark Air Service** has begun construction of a new business flying center at the airport. Expansion will provide about 1,580,000 cubic feet of space with facilities for maintenance and service; passenger lounge; conference rooms; catering service and ground transportation.

• **First B. F. Goodrich** technical forum for business aircraft pilots and maintenance personnel will be held June 13 at Teterboro Airport, N. J. The forum is being jointly sponsored by Atlantic Aviation Corp. and the Newark Branch of Airwork Corp. Goodrich officials will lecture on installation and care of de-icer equipments; maintenance of wheels and brakes; and tubeless tire installation.

• **Standard Oil Co. of California** has issued its Spring 1956 Directory of Standard Airport Dealers, providing information on airport dealer locations and types of aviation fuels available to pilots within seven Pacific West states and Alaska. Copies are available from the companies Western Operating Division, 225 Bush St., San Francisco 20, Calif.

Converted Douglas A-26

New conversion of a Douglas A-26 Invader recently was completed by On Mark Engineering Co. of Glendale, Calif. and delivered to Humphreys Gold Corporation. Work included stripping and rebuilding the hull and installating custom cabin and cockpit. Conversion carries crew of two and six passengers. Range of plane is 2,000 miles.



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LEAR

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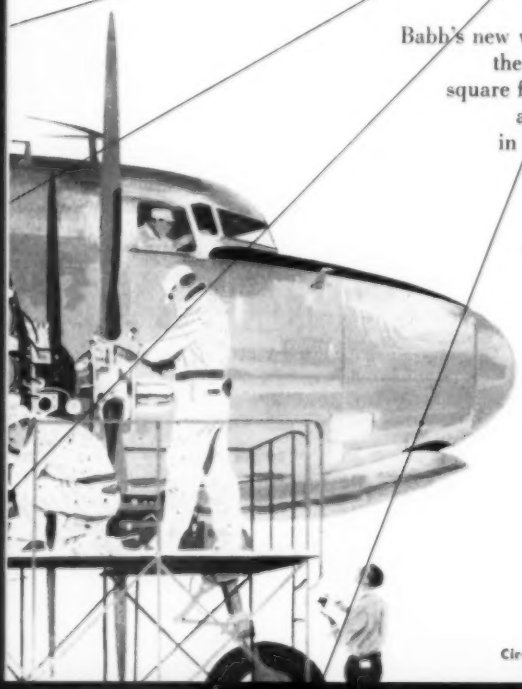
New World Headquarters for babb

In the heart of the nation's jet operations—the Pacific Southwest—Babb's new world headquarters reflects its steady growth during the past quarter of a century. Its modern facilities with 134,000 square feet under roof, and 100,000 square feet of concrete aprons centered on 43 acres are designed for further expansion in the jet age. Here is the nerve center of...

BABB'S World Wide Services and Facilities

Engine, propeller, accessories, instrument and radio overhaul and service... aviation parts... and military and commercial airframe overhaul and modification.



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Sky Harbor Airport, Phoenix, Arizona

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Linden, N.J.; St. Johns, Quebec, Canada;
Glendale, Calif.; Miami, Fla.; Washington, D.C.;
London, England; Paris, France; Brussels, Belgium;
Zurich, Switzerland; Rome, Italy; Damascus, Syria.

Circle No. 27 on Reader Service Card.

TRANSPORT TRENDS

Washington, D. C., May 7, 1956

THE TRAFFIC BOOM CONTINUES. When all first-quarter traffic reports are in, domestic trunks' passenger-mile gain will be at least 13-14% over last year. And figure was held down somewhat by long Western strike. Passenger-miles outgained available seat-miles, raising load factors. Seat shortage this summer still looms.

●

CAB IS EXPECTED TO DECIDE SOON whether to start an investigation of airline passenger fares. Pressures for an investigation have been building up, particularly from Congressional quarters. Board's staff has completed material for use by the members in reaching their decision. There are no indications that the agency will wait until the Senate votes on its fifth member, G. Joseph Minetti. Of present members, Republicans Gurney and Denny voted against an investigation in 1953. Democrat Adams favored it, and still does. New Chairman Durfee's position isn't known.

●

CONTROVERSY WILL MARK traffic conference meeting of International Air Transport Association in Cannes, France, this month. Transatlantic fares will be the key issue. CAB insists on a reduction. Some other governments don't go along with this thinking. If there's no agreement, an open rate situation is a possibility. New ideas will be aired at Cannes. Pan American wants a "thrift" fare in very high-density planes, no meals. Some European lines favor a 21-day excursion fare.

●

ANOTHER SOUTHERN TRANSCONTINENTAL ROUTE CASE is shaping up at CAB. Five years ago, Board turned down all applications for such routes in favor of National-Delta-American interchange, which is still operating. Now, however, CAB is investigating complaint by city of Dallas that its air service to California is inadequate. And numerous airlines have applied, or intend to apply, not only for Dallas-California rights, but for routes to and from points southeast of Dallas.

●

LIVELIEST TECHNICAL SESSION of the year is expected in September. It's the annual airworthiness regulations review, when airframe, engine and airline engineers meet with CAB. Jet transports and turbine engines have virtually taken over the agenda. Illustrative of topics expected to cause lively discussion are proposals by Air Line Pilots Association now being circulated for comment: cycle-load testing of fuselage nose sections off the production line to prove out jet structural designs; new measures to control cockpit noise levels; crash fire inerting systems; crash resistant fuel tanks.

●

PROPOSED ONE-CENT BOOST in air mail postage would add between $16 million and $20 million to Post Office revenues. And there'd be no increase in expense. Opinion is still split on chances of postage boost this year. Some observers say prospects are brighter than ever. Others pooh-pooh the idea that Congress would hike rates in an election year—unless White House puts on unusually heavy pressure.

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THE FIRST NONSTOP DC·7 AIRCOACH SERVICE COAST TO COAST ONLY $99!

Plus tax

The comfortable lounge, available to all passengers

American presents "The Royal Coachman"—new luxury aircoach

*New York-Los Angeles $99 *plus tax*—**Washington-Los Angeles $98 *plus tax*

Starting May 20th, American introduces the *first nonstop aircoach* service coast-to-coast on the DC·7, world's fastest airliner. This is the *fastest* transcontinental aircoach service.

"The Royal Coachman" is also the most *luxurious* aircoach service in history. You can *reserve* your seat when you buy your ticket. There is a spacious passenger lounge and fine meals are served, available at economical prices.

"The Royal Coachman" is an *all-coach* service, operating every day in the week. For reservations and flight information on this new service, see your travel agent or call your nearest American Airlines ticket office.

*service starts May 20th
**service starts June 3rd

AA

AMERICAN AIRLINES

America's Leading Airline

State Dept., CAB Wrangle over Foreign Routes

Question of how to negotiate with foreign governments causes clash between two agencies; new policy in making.

By WILLIAM V. HENZEY

THE TECHNIQUE used by this country in dealing in airline routes with foreign governments, in effect for more than 10 years, is coming apart at the seams and appears on the verge of a general overhauling.

Most symbolic of the current situation is the dispute between the Department of State and the Civil Aeronautics Board over which should occupy the top ranking in foreign route negotiations. A white-gloved type of disagreement for the past few years, the dipute has deteriorated into what a Senate subcommittee now calls a "serious tug-of-war."

Quite apart from the obvious question of pride, the dispute reflects basic differences between the Board and State over such things as how to negotiate with foreign governments, what to give up and what not to give up, what role U.S. airlines should play and to what extent U.S. airlines' competitive interests should be considered.

At present there are no indications who the winner will be but there is a clear mandate from Congress that the issue should be resolved in a hurry.

Until last year, it was considered normal for a CAB Member to be designated as the head of a U.S. negotiating team. Late in 1955 State took over the No. 1 role with the naming of U.S. Ambassador to India John S. Cooper as chairman of the U.S. group slated to conduct talks with India.

• **Active leader** of the group, however, was Livingston L. Satterthwaite, special assistant to the Deputy Undersecretary of State for Economic Affairs. Relegated to the background, at least from the standpoint of protocol, was CAB Member Chan Gurney, former U.S. Senator from South Dakota, former Board Chairman, and ranking Republican on the Board.

Then came talks with the British in March of this year. Satterthwaite was named chairman of the U.S. group which once again included Gurney.

Last month, negotiations with the Dutch opened in Washington and Thorsten V. Kalijarvi, deputy assistant secretary of State was named to head the U.S. team. Included in the group was CAB Member Harmar D. Denny.

There is no apparent dispute over the capabilities of the individuals so named, but over the policy involved.

• **The situation** was explained this way by former CAB Chairman Ross Rizley in a letter last month to Senator George A. Smathers (D., Fla.): "It must be understood that the Department of State takes the position that the actual conduct of negotiations is its responsibility.

"This was recently reiterated and elaborated in connection with the British negotiations held in London March 5-16, 1956, and which were concerned principally with route and rate problems. Prior to the negotiations, the Department notified the Board by letter that 'following careful consideration in recent months of the designation of the chairmen of delegations to bilateral aviation negotiations, the Department has now come to the conclusion that it should establish as a general principal that the chairmen of future aviation negotiations should be drawn from the personnel of the Department'."

Rizley went on: "In explanation of this position, it was further stated that 'this decision is based upon the statutory responsibility of the Department to conduct negotiations with foreign countries and also because of the fact that the public generally looks upon the Department as being primarily responsible in this field and hence the success or failure of any given negotiation reflects directly upon the Department of State'."

• **Commenting on this,** the Smathers group, which is a subcommittee of the Senate Interstate & Foreign Commerce Committee, said: "The (Rizley) letter indicates a serious tug-of-war between the State Department and the CAB as to just which agency is the dominant one in these negotiations.

"This problem, while never actually brought out into the open, was clearly indicated as being serious throughout the hearings (on U.S. negotiating practices). It was only after a State Department indication of a stalemate during the formal negotiations in Washington that CAB and State met in secret, and then announced

(*Continued on page* 78)

Durfee Takes Over as CAB Chairman

James R. Durfee, formerly chairman of the Wisconsin Public Service Commission, was sworn in last month as a member of the Civil Aeronautics Board and was named Chairman. He is shown, center, taking the oath from Appellate Court Judge Walter M. Bastian. Others, from left: Members Chan Gurney and Harmar Denny, Sen. Alexander G. Wiley (R., Wis.), and Member Joseph Adams.

(*Continued from page 77*)

the routes to be awarded to Germany (in 1955).

"This type of problem must be resolved, if necessary by legislation, but the subcommittee is first asking additional information from the agencies."

As previously stated, this dispute symbolizes basic differences between CAB and State in functions and over-all philosophy. CAB, for example, is considered the expert Government body on the subject of air routes, both domestic and foreign.

But whereas, as an arm of Congress, it has final and absolute say on domestic route matters, it is relegated to the role of expert adviser to the Executive branch of the Government on international route affairs.

• **On the surface,** CAB determines which routes may be bargained with and for in negotiations with foreign countries. But after such determination is made, it is subject to revision by the State Department, which only has to cite such things as "over-riding national interest considerations."

This submersion of the accurate determination of the expert on routes to the apparently nebulous controlling vote of the expert in diplomatic negotiations, is what currently has Congress and the U.S. airlines in a quandry.

While apparently lacking the final solution to the problem at this time, the Smathers subcommittee has a suggestion for improvement.

• **"State should create,"** Smathers said, "appropriate and adequate facilities to handle the negotiation of air transport agreements and consultations under them. This undertaking . . . should result in the creation of posts of rank and responsibility commensurate with those of foreign governments, and qualified Foreign Service Officers should be selected to fill them.

"With the development of international aviation, it seems clear that it would be necessary to have several persons, some able to travel abroad and some to remain in Washington, to cope with the many negotiations and consultations which will be required in this field."

In short, Smathers told State that, if it is to exert itself as the No. 1 U.S. agency in bilateral discussions, it should properly equip itself.

• **The Smathers subcommittee** was established last year under the impact of the U.S.-Germany bilateral agreement which Congress termed a "give-away" in U.S. air routes to the German line Lufthansa. The Senate group broadened its inquiry into the over-all field of international air agreements.

Its mandate for CAB and State to resolve their differences was one of numerous recommendations made in the subcommittee's initial report. It will continue to function indefinitely but, meanwhile, also directs:

1. That the U.S. should not make route grants which cannot economically be operated without violating existing capacity principles.

2. That in the case of current agreements, the U.S. should insist upon performance of the basic principles of the agreements and make full use of agreed rights to consultation . . . or even termination . . . if abuses develop.

3. That the government avail itself of the expert assistance within the air transport industry.

The subcommittee said it will continue to function in order (a) to observe the development by the Government of a procedure for working with the carriers; (b) to insure that such procedure is satisfactory; and (c) to watch the formulation of an effective program for enforcement of so-called "Bermuda principles"—all in all, so that "we can be certain, at this important transitional stage, of the maintenance of the deserved preeminence of the U.S. in world air transport."

Napier Engages U.S. Firm to Promote Re-engining U.S. Transports with Elands

Britain's Napier engine company has contracted with a U.S. firm to promote a program for the re-engining with the Eland turboprop of various U.S. transport aircraft types, notably the Convair 340 and the Douglas DC-6/7 series. Napier has signed an agreement with Aircraft Supply Company of Washington, D. C. covering the program.

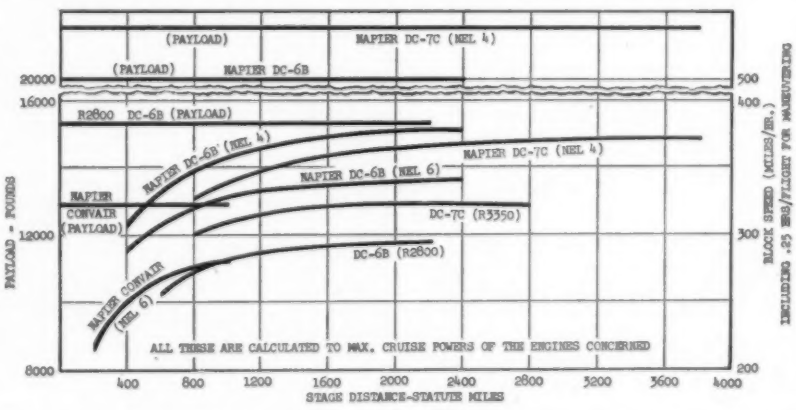
Bernard J. Vierling, a partner in Aircraft Supply Company and formerly Director of Engineering and Maintenance for Capital Airlines, estimates that there are 3,200 piston engines in current U.S. transport aircraft that could be replaced by turboprops. Both Vierling and his partner, Robert H. McRae, were originally with Douglas Aircraft Company.

It is claimed that by fitting Elands to a DC-6B, for example, the aircraft can achieve speed and economies not possible with its present piston engines. Block times better than those presently achieved by the DC-7 and Viscount are quoted. For example: Washington-Chicago, 1 hr., 54 min.; New York-Chicago, 2 hrs., 18 min., and New York-Miami, 3 hrs. 18 min.

• **The DC-6/7 conversion** is reported to be attracting the attention of several U.S. operators including one in the New York-Florida market and one that has a transcontinental service. One problem that has to be overcome is the acquisition of an aircraft for certification purposes. There are indications, however, that one of the military services might be interested in cooperating.

One project for converting the DC-6B to turboprop power includes: clipping the wing tip from 35 in. to 11 in.; replacing the rudder fabric with metal; stronger reinforcements throughout the fuselage; skin gauge increase near tail; spar cap reinforcements in stabilizer; frame reinforcements adjacent to stabilizers; increased plating gauge around the landing gears. Reducing the zero fuel weight cuts the need for any further structural beefing while clipping the wing tips obviates the need for more reinforcement of the wing.

While the DC-6/7 re-engining program is still very much of a project, the Eland-powered Convair is actually flying in prototype form in England. It will be flown across the Atlantic this



Performance advantage of substituting Napier Eland turboprops for piston engines on the Convair 340, Douglas DC-6B and DC-7 are pointed up in this chart.

How come nobody picks on the hummingbird? He's tiny, he's inoffensive, and he spends his time tranquilly fooling around among the flowers while bigger birds battle noisily for survival. By rights he ought to be extinct, but he's left alone because he packs a fearsome weapon and knows how to use it. With his rapier-like beak and darting speed, he is feared by would-be intruders as a veritable D'Artagnan of the honeysuckle. Until the happy day comes when lions will lie by lambs and predators are out of politics, the cause of peace is best served by those equipped to defend it.

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summer and will be demonstrated in various parts of the U.S. in August and September.

• **Fitting turboprops** to the Convair improves performance by about 50 mph over the piston-engine version. Per-hour revenue is increased by some $80, according to Napier. This means that the re-engining cost of about $300,000 is paid for in under 4,000 hours of revenue flying.

The above figures apply to fairly short stages. As the stage is increased the Eland Convair shows greater advantage. At a range of 610 miles and cruising at 10,000 ft., for example, the average block speed is some 400 mph.

Slick Airways Orders Five DC-6As, Four DC-4s

Slick Airways is adding five DC-6As and five DC-4s to its freight fleet.

Negotiations have been completed with Douglas Aircraft for purchase of five DC-6As, deliveries starting in early 1958. The company has also bought two DC-4s from American Airlines, two from United and one from TWA. Slick recently dropped its $30 million anti-trust suit against these carriers and Air Cargo, Inc., and became an associate member of the Air Transport Association.

D. W. Rentzel, Slick president, said the company also hopes to be able to obtain all five of the cargo planes (two DC-6As and three DC-4s) that are to be leased by USAF.

The new purchase will increase Slick's DC-6A fleet to 11. The company now has five, with one on order for delivery in February, 1957.

Trans Caribbean to Have Scheduled Flights

A new scheduled service from New York to Puerto Rico and the Virgin Islands will be inaugurated on June 15 by Trans Caribbean Airways which will be implementing authority granted by CAB in its controversial decision in the Large Irregular Air Carrier Investigation.

Trans Caribbean's service will be on a bi-weekly basis aggregating ten flights each month as permitted by the new CAB authorization. Fares will be approximately 4¢ per passenger mile. Round-trip between New York and San Juan, for example, will be $99, as compared to Pan American World Airways' round-trip tourist fare of $128.

According to Trans Caribbean's president, O. Roy Chalk, service will include such items as "a retinue of three cabin attendants on each flight, complimentary meals, liqueurs, music, and entertainment."

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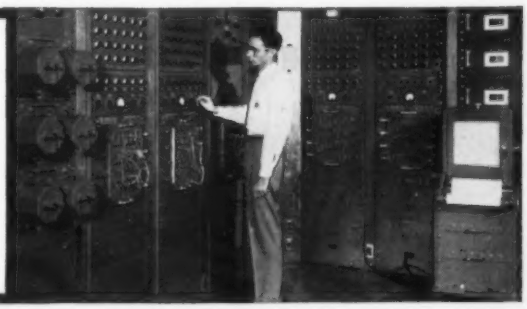

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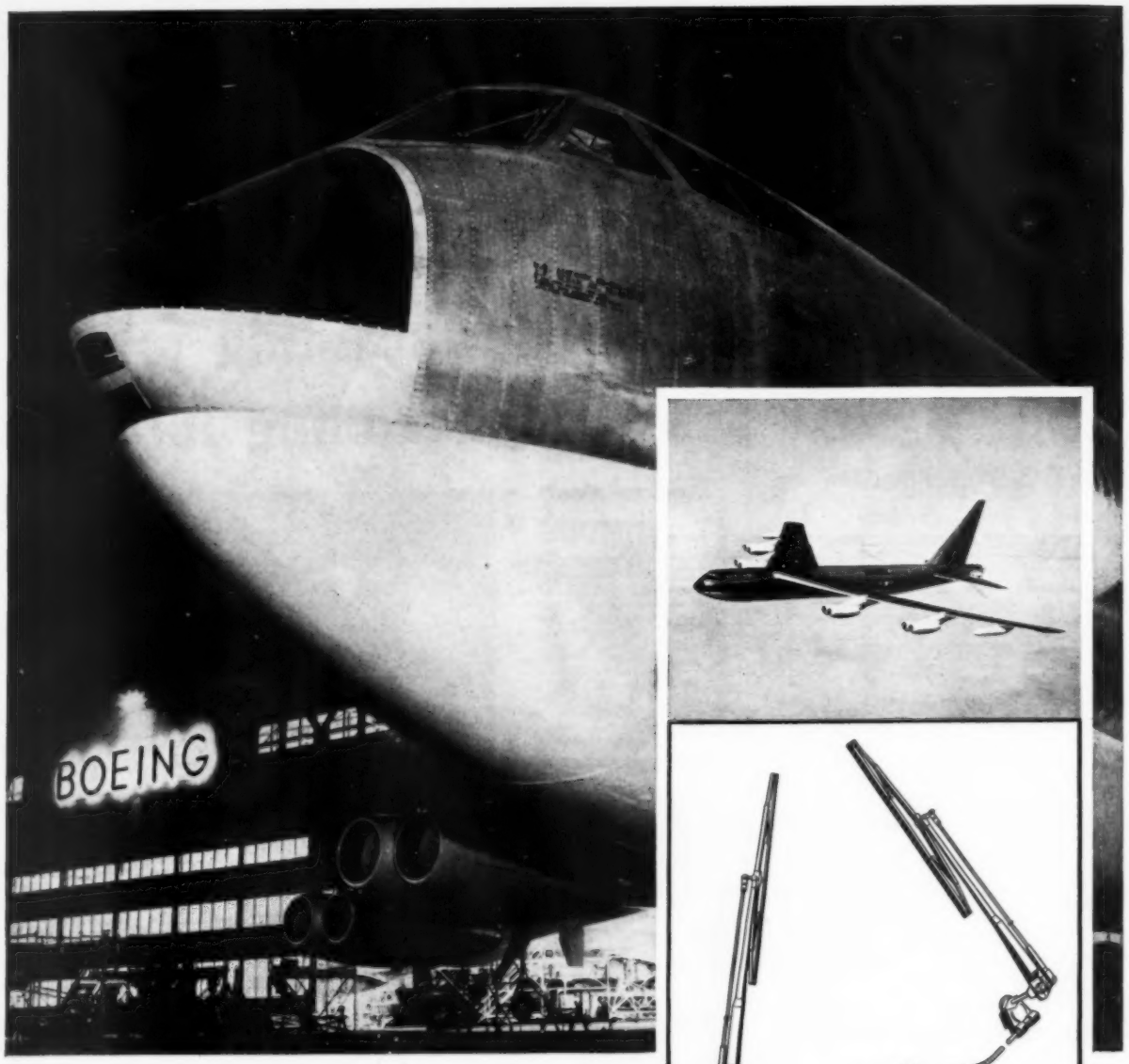

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Airlines Oppose Bill Banning Liquor

Airline management opposes bills in Congress that would prohibit serving of liquor aboard commercial flights, but the cabin attendants support the legislation, the House Commerce transportation subcommittee has been told.

The group, considering several bills to ban liquor and to allow reduced fares for ministers, heard Stuart G. Tipton, Air Transport Association president, state that CAA, CAB and the Commerce Dept. have never found that serving of drinks adversely affects safety.

The bills would deny "to the 8,000,000 who desire it (a figure reached through a survey) the right to be served liquor in aircraft," he said.

• **On the other hand,** R. K. Quinn Jr., president of Air Line Stewards and Stewardesses Association, cited a list of "incidents" that have occurred aboard aircraft since carriers started serving drinks. He said a drunken passenger is a potential threat to safety and is socially undesirable. Liquor service is "causing an unnecessary burden upon air crews and many unpleasant incidents for passengers," he asserted.

Meanwhile, Commerce Secretary Weeks wrote the Senate Commerce Committee that his department opposes the legislation. CAB, he said, already has authority to ban drinks if it finds the practice affects safety.

Tipton opposed reduced fares for ministers, stating that the legislation would, in effect, require all passengers, other than ministers, "to contribute, through higher fares, to all of the churches to whom rate concessions are granted." People should be permitted to make charitable contributions voluntarily and directly to the institutions they desire to support, he added.

CAB Proposes 'On-Time 75%' Rule

The certificated airline industry has until May 16 to file comments with the Civil Aeronautics Board on a proposed regulation which would require on-time performance of a minimum of 75% of all scheduled flights.

The would-be rule stems from a controversy dating back to the American Airlines pilots' strike in 1954 when Air Line Pilots Association claimed the carrier was not meeting published transcontinental nonstop schedules.

Since that time, CAA and CAB have conducted studies aimed at determining just how realistic airline schedules are. In its recent rule proposal, CAB said it "appears that many certificated carriers are currently publishing . . . flight schedules which do not accurately reflect their actual times of departure and arrival."

Further, "The Board is concerned with the relationship of these unrealistic scheduling practices to its statutory responsibilities to regulate economic aspects of air transportation. Any carrier which misstates, by its scheduling practices, the actual arrival and departure times of a substantial part of its scheduled flights, operated between one or more of the pairs of points served, appears to be delinquent in its obligation to render good and adequate service and to deal fairly with the traveling public."

The proposed rule declares that any carrier failing to perform at least 75% of the flights actually operated pursuant to an individual schedule, in any calendar month, as on-time flights is deemed to have violated its requirements. The rule applies to certificated carriers engaged in inter-state and overseas air transportation and to all flights other than all-cargo flights.

Ozark Gets Approval Of Des Moines-Chicago Run

Ozark Air Lines has been granted a three-year certificate to operate between Des Moines and Chicago via Ottumwa and Burlington, Iowa, and Peoria, Ill. During the same period, Braniff Airways' authority to serve Burlington and Ottumwa has been suspended.

Vice Chairman Joseph P. Adams disagreed with a majority ruling which requires Ozark to serve at least two intermediates on all flights over the new Des Moines-Chicago route. Adams said he favors a one-stop requirement.

Court Upholds CAB In Nonsked Name Case

U.S. Supreme Court has upheld, pending further hearings by the U.S. Court of Appeals, a Civil Aeronautics Board decision ordering North American Airlines to cease and desist from use of that name.

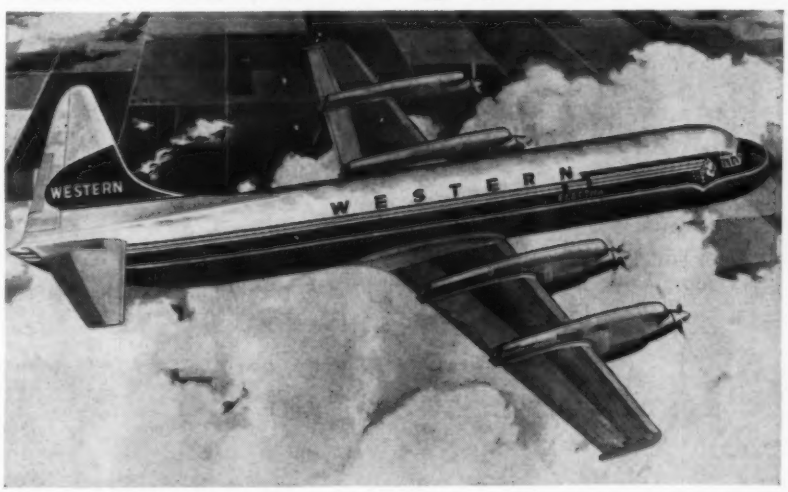
The high court held that CAB acted within its jurisdiction and if its findings are supported by "substantial evidence" it can rightfully enforce the cease and desist order. Two members of the nine-man Court dissented.

Accordingly, the case was remanded to the Appeals Court to determine if CAB's findings were based on substantial evidence. Previously, the Appeals Court reversed the Board's decision. American Airlines, an intervenor in the CAB case and Appeals Court trial, brought the Appeals Court decision before the Supreme Court.

CAB initially had found ". . . the record is so convincing that the public interest requires this (cease and desist) action in order to prevent further public confusion between respondent (North American) and intervenor (American) due to similarity of names."

Pending further hearings by the Appeals Court, meanwhile, North American is free to continue use of its name.

Western Orders Nine Turboprop Electras



Western Airlines has ordered nine Lockheed Electra four-turboprop transports which will provide 450 mph service on its 12-state network. Planes will carry up to 85 passengers, will be powered by Allison Model 501-D13 turboprop. WAL is sixth airline to order Electra.

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Airline Commentary

By Eric Bramley

Domestic airlines' no-shows and late cancellations in the first three months of 1956 totaled an alarming 17.6% of boardings. It's partially due to lack of a penalty system or reconfirmation rule. But—many a conscientious passenger who tries to cancel space he can't use is unable to reach the carrier by phone. No customer likes busy signals or long waits on the phone. Telephone service, particularly during rush hours, leaves much to be desired.

* * *

A man phoned TWA in San Francisco and made the following amusing plea to reservations agent Mary Anne Daum: "Before you say anything, be kind, be charitable—I want a seat to Los Angeles tonight. I'm a friend of absolutely no one who knows any of your officers or directors." Miss Daum replied: "I'll be happy to place your name on the waiting list, or might I suggest you go to the airport and stand by." Retorted the man: "You've been charming, but useless."

* * *

It seems to us that when you have half a dozen airlines renting expensive space in a hotel they could save themselves some real dough—and do the customers a service—by getting together in a joint office. For example, the Beverly Hilton in Beverly Hills, where you have United, TWA, Western, American, Swissair, Sabena and LAI. In a situation such as this, and in others around the country, the view from this corner is that airlines are overly touchy about this business of individual identification, especially when in most instances they have their own ticket offices in other locations near the hotels.

* * *

Odds and ends: One airline has cleaned out a ring of baggage handlers that had been lifting valuables out of passengers' bags . . . United Aircraft Corp. spent $870,042 for passenger travel on scheduled airlines last year, an additional $446,990 on freight and express, and $82,869 on air mail and parcel post . . . Allegheny Airlines tells us that its no-show situation has shown definite improvement since it reinstated the reconfirmation rule. And there have been practically no gripes from passengers about the rule, it claims . . . Wonders never cease. Pan American, which has often fought TWA in the international route field, has pulled a switcheroo and now tells CAB that both PAA and TWA should get transpolar routes. Enough business for everyone, PAA says . . . Air travel cards outstanding at the end of 1955 totaled 712,987, up 9.3% over 1954 . . .

Sales, Traffic, Promotion

In a major switch, TWA has canceled out Batten, Barton, Durstine & Osborn as its advertising agency, effective July 1, and signed with Foote, Cone & Belding. TWA spent $5,505,000 on advertising in 1955, of which $4 million went through BBDO and the rest through other agencies abroad . . .

The popular "Music 'Til Dawn" radio program (CBS) has been renewed by **American Airlines** for three years. Contract is said to be for one of the largest blocks of spot radio time ever purchased in the history of broadcasting—29,133 programming hours at a cost of nearly $1 million. Program is heard in five cities: San Francisco, Los Angeles, Chicago, New York and Washington. Starts at 11:30 p. m., six days a week . . .

New air hostess "suits" that don't look like uniforms have been designed for **Capital Airlines** by Handmacher of New York. No brass buttons, epaulets or other marks of a uniform. Outfit includes short-sleeve blouse, tight-fitting bolero jacket and straight skirt with back kick-pleat . . . Capital has added Campbell's "hot buttered soup" as a between-meals snack on Viscounts and Constellations . . .

Honors received: **Capital** was awarded first prize by American Public Relations Association for its outstanding 1955 public relations program. Company was cited for its public relations efforts in placing "the Viscount in a pre-eminent position in the air transport industry" . . . Advertising Club of Denver awarded **Frontier Airlines** its "ad-of-the-year" certificate for the outstanding radio commercial . . . **Allegheny** and **Piedmont** were the two local service lines rated highest in advertising by "Transportation Ad-Views" in 1955 . . .

New sales promotions being worked on by the special features unit of **Pan American World Airways'** advertising department include a TV film with artist Norman Rockwell, a record album of music from everywhere, movie tie-ins, and maybe a TV travel program . . .

Port of New York Authority has issued a promotional pamphlet on Newark Airport, entitled "Your Quickest Ticket to New York." Describes the field's facilities and stresses that it's only a 20-minute ride from 42nd St. Airlines are using 150,000 of the pamphlets in direct mail and as inserts in ticket envelopes . . .

United Air Lines has published "A Sky Ride for Baby" folder, listing services made available to mothers traveling with children. Company says that in the last two years it has flown more than 100,000 infants under two years of age. Bassinets are being installed in UAL DC-7s. They fasten to the forward bulkhead in the main cabin. Mothers can reserve seats next to the bassinets . . .

Slick Airways has come up with three new aids for shippers. For garments it has a new lightweight corrugated box designed to hold 18 hangers plus three to five drop eyelets for each hanger. Manufacturer can ship garments on hangers, eliminating folding and packing. Box will hold 100 lbs., costs $1.50, with quantity discounts available. Company also has a "pet-pack" which pet shippers can use for a $4 charge. Weighs 18 lbs. and is completely collapsible to 4-in. thickness. For horse shippers, it has a 225-lb. stall, renting for $25 per flight . . .

Continental Air Lines' survey of 8,900 passengers showed: (1) 31% made five or less trips of 300 miles or more during the past 12 months, 18% made 6-10 trips, 19% made 11-25, 12% made 26-50, and 10% made over 50; (2) if CAL's service hadn't been available, 45% would have taken another airline, 20% would have driven their cars, 16% would have taken the train, 3% would have taken a private plane, 4% wouldn't have made the trip; (3) 52% said flight's arrival time was most important to them, 48% said departure time was more important; (4) 66% were making round-trips and 82% of these had bought round-trip tickets; (5) 76% of passengers were male, 24% female . . .

Hertz Corp. has acquired Carey Driv-Ur-Self Inc., largest car rental firm in the New York metropolitan area . . . Continental is distributing a new folder explaining its weather avoidance radar . . . **AVIANCA** is offering summer Calypso cruises to the Caribbean. All-expense rates range from $285 for eight days in Montego Bay to $810 for a 23-day all-Caribbean tour . . .

Now released is Columbia's high-fidelity, commercial, long-playing record, "European Holiday." This is an expansion of the original, and highly successful, **Scandinavian Airlines System** record of a musical flight to and through Europe. Columbia is now merchandising it to the public . . .

A total of 627 people used **Eastern Air Lines'** Miami Beach summer vacation package plan on April 15, first day it became effective. This was a 250% jump over first-day traffic in 1955. EAL's goal is 55,000 package sales this year . . .

American Airlines says its eastern region led in 1955 gross ticket sales with $86,538,229, followed by western region with $54,786,510 and central with $53,175,280. Last year's go-now-pay-later revenue hit $820,901 . . . AA has opened a ticket office in the inner lobby of the Waldorf-Astoria in New York . . . AA passengers going to New York can make advance seat reservations through their local AA ticket office for any home games played by New York's three major league baseball teams . . .

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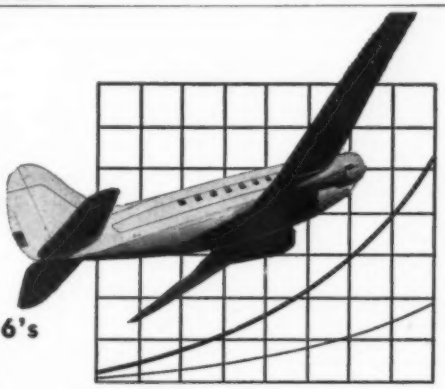

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EN ROUTE . . .

WAYNE W. PARRISH

Living Opposite the Kremlin

(Lenin Slept There)

It was Saturday morning when I arrived in Moscow. It was cold and a light snow was falling. My Intourist interpreter and Lennart Rehnqvist of SAS drove me to the National Hotel, which was to be my home for a week.

What struck me first about Moscow was the low height of the buildings we passed en route. Mostly two or three stories. There was no indication that this was a big metropolis. Buses and trams were operating and there was some traffic but it seemed like a quiet Sunday morning, not Saturday. Many streets were wide. The building architecture was without distinction, all rather plain. There was no advertising of any kind, of course. The absence of signs in Russian cities makes them unique in the world and contributes to their dreariness.

Then a few larger buildings appeared and we passed the Bolshoi Theatre. As we approached a big square Rehnqvist said quite calmly, "There's the Kremlin over there." My first reaction was one of being let down. I had expected something much bigger and more impressive. I guess I expected the physical aspects of the Kremlin to be at least as expansive as the connotation which the word has had throughout the world. By the end of a week, however, the Kremlin shaped up into an interesting compound of architecture and buildings, somewhat larger than the first impression.

We pulled up in front of my hotel overlooking the Kremlin across the square. My first hope was for a front room.

Old, Famous . . . But 3d-Class

The National is an old and very famous hotel. By modern U.S. standards it would rate third-class at best, but it is certainly quite adequate for a tourist visit. It is one of three operated by Intourist. If you are a guest of the government, or are in Moscow on business with the government, you are likely to stay at the Moscow or some other newer hotel. Of the three Intourist hotels, the National certainly has the best setting and would be my choice.

As with all tourist hotels (and at the American embassy, too) there is a guard on duty at the main entrance 24 hours a day. The lobby is quite small. There is a newsstand but no foreign publications are for sale. There is one slow elevator for the four or five floors. The desk which serves as the front office is next to the stairway directly ahead. The Intourist office where you arrange for sightseeing and tickets is on the first floor above. So is the restaurant.

I was assigned Room 107, which faces the front. I found out a few days later that this is the room Lenin supposedly occupied for several weeks after he came to Moscow to set up the government after the revolution. Not only

Looking east with St. Basil's Cathedral (now a museum) in background. This photo and others on page 90 were taken by Lt. Col. William Adams, U.S. assistant air attaché in Moscow.

does it have an excellent view of the Kremlin but there is a direct long-range view into Red Square with its mausoleum containing the bodies of Lenin and Stalin. Intourist said I could have Room 107 anytime I returned to Moscow.

As things go in Russia, it was a first class layout. I had a very large sitting room with big dining table and an enormous desk. The furniture was all upholstered. The chandelier had no fewer than 15 light bulbs and the orange-shaded lamp had two, so I was not lacking in light. My bedroom was large with two beds and plenty of space for clothes. I had a substantial entrance hall, and a large bathroom with poor lighting and old fixtures. But the many windows facing the square and the Kremlin made up for any deficiencies, because the National is at the busiest and most historic center of Moscow.

Days Dark, View Eerie

As I've told you, it gets dark early in the northern part of Russia in winter. Even many days are dark. So for a week in the late afternoons and at night I would look out of my windows toward the Kremlin, often through the snow. On each of the five big towers, three of which were visible to my view, were huge illuminated red stars. Quite an eerie sight. From one of the towers came chimes every quarter of an hour.

Room 107 is on the second floor, or what we would call the third. At the head of the stairs was a lounge with a television set. It was in this lounge that those British gents, Burgess and Maclean met the press in their dramatic reappearance not long ago. One of my neighbors was Irving R. Lavine, the NBC correspondent. Many correspondents stay at the National.

I was glad to have somebody I knew to talk to. Rehnqvist was on his 12th trip to Moscow in five years, all on business for SAS. We ordered some breakfast in my room and I shaved quickly, and then went out on a quickie orientation tour and to take some snapshots of me in Red Square.

When we crossed Gorki street, one of the main thoroughfares leading off the square in front of my hotel, Rehnqvist pricked up his ears and told me to watch. A car filled with one or more "VIP's" was leaving the Kremlin. Such a VIP car has a special kind of staccato horn. The traffic lights all turn yellow and the pedestrians and other traffic get out of the way while the VIP car comes through with top priority and top speed along a special lane marked off in the center of the street.

The curtains were drawn in the rear of the car so I have no idea what Soviet bigshot was traveling by. It's one of those classless society things in Russia where everybody gets equal treatment except those who get better.

Red Square Quiet

We continued on toward Red Square. There were crowds in the streets, everybody bundled up, and everybody trudging some place, mostly in silence. In a few minutes we were in Red Square. I'd seen many pictures

of it but it still wasn't quite what I expected. And it's difficult to describe. Along the side opposite the Kremlin wall is the big department store called Gom for short, a long building of grey stone which looks more like an old-fashioned university building than a store. There is heavy traffic along this side of the square. The remainder of the square is for sightseers and is featured by two particular sights. Below the Kremlin wall is the mausoleum for Lenin and (probably not for much longer) old Joe Stalin. At the east end of the square overlooking the river is St. Basil's Cathedral, certainly one of the most amazing bits of architecture in the world. It sits squat on the square and its many candy-striped towers are painted all sorts of colors. Quite a sight.

Rehnqvist took me into the department store. It's quite big, but some of the western correspondents have written it up as though there was nothing like it anywhere in the world. Let's face it, it's a shambles compared to Macy's or Gimbel's or any other first-class store in the U.S., England or France. There is a vast amount of unused and poorly organized space. But it is a big, sprawling sort of place which one might expect to be organized by a bureaucrat who knows nothing of merchandising and who's never seen a real store before.

Peasants Just Look

The Gom is a series of glass-covered arcades and the peasants from the country come there by the droves to gawk at the goods for sale. I bought a china figurine for three times what it was worth but decided I should have a souvenir of Moscow. I noted that in this particular shop, about the only one that had so-called art objects for sale, the peasants were standing four deep. Buying? No, just looking.

There was a stand selling champagne by the glass, and there was a food section which was packed. Some days later I spent quite a bit of time walking through every part of the store. I even saw an electric train being demonstrated and a big crowd was watching. But the consumer goods situation in Russia is not only poor it's pathetic. The only thing I was ever able to figure out was that in a workers' paradise the worker gets less than anywhere else in the world. But by all means you must spend time in Gom when you go to Moscow. It's a good place to watch people at close range and you'll like the U.S. so much better when you leave.

Rehnqvist took me to the Intourist office in the National to meet the manager, a Mr. Rogoff, a balding round-faced man who looked harassed most of the time. And well he might. He had about a half-dozen girl assistants, few of whom could speak more than Russian. The red tape of making arrangements for tourists from all over the world is considerable and it was up to Mr. Rogoff to produce theater tickets, train and plane reservations, hotel accommodations elsewhere, and arrange for sightseeing and local transport. Every so often brother Rogoff would appear a little relaxed and smile. I never did figure out whether he liked his job but it was a thankless one and called for long hours. I was to call on brother Rogoff quite a few times during the week.

Borscht, A Meal in Itself

My first meal at the National started off pretty well. First of all, Rehnqvist not only speaks Russian but has stayed in that hotel a number of times. I tried the borscht, which is a big meal in itself of cabbage soup with a lot of other stuff including meat thrown in for good measure. Very filling, and not too bad as a catch-all dish. Then I had some white chicken meat fried in a pastry batter that was really pretty good but awfully rich. It was one of the few good meals I had in Russia. The dining room is plain, the table cloths changed not oftener than once a day, and the service indifferent.

I contacted the American embassy on Saturday afternoon and found that Col. Charles E. Taylor, our air attaché, was expecting me. He was out of town but others had been alerted and seemed to be surprised that I was already in my hotel in Moscow. I was picked up for a cocktail party in the embassy compound that evening—a typically American affair—and had dinner in the apartment of one of the attachés. They were all celebrating the arrival of an Army attaché from Ankara and I was glad of some American company.

I was lucky to get a ticket to the Bolshoi theatre for Sunday noon for Tschaikowsky's Swan Lake, one of the finest ballets of all time. (One of the embassy Americans had a spare ticket). So from 12 to 3 I saw a very fine performance in Moscow's famous showplace where all the visiting politicos are taken by the Kremlin boys. There were a lot of young people in the audience. The orchestra of over one hundred pieces was superb.

Stores Open on Sunday

Sunday is only a partial holiday in Russia. The stores are all open. Many of them close on Mondays. The idea is that the workers would be able to shop on Sunday which would be a good idea if there was anything within reason to buy.

I learned about Moscow living from some of the embassy people. Baby sitters charge $2.50 an hour. One couple decided to have a night out to celebrate a birthday and the evening dinner bill ran to $65. No matter what you do in Russia, it's expensive except on Intourist coupons. Using the cost of a man's suit ($400) as an example, you can figure that out for yourself. These prices are all according to the official but very arbitrary rate of exchange. I wanted to buy a big astrakhan hat but found out these cost $80 and up.

I had only one opportunity to visit a government office. Thanks to Rehnqvist, he arranged a visit for the two of us to the office of Mr. V. Ankudinov, chairman of Intourist. The interpreter, L. Hodorkov, had been with the chairman to a tourist meeting in England a few months earlier, so we had a pleasant discussion about the prospects for tourists visiting the U.S.S.R. and I said I thought the rate of exchange was pretty tough for visitors although the Intourist tours themselves were pretty reasonable.

Mr. Ankodinov said that exchange rates were the business of another government agency, to which I replied that however that may be, Intourist had to speak out for tourists. I imagine that buck-passing among government agencies is very common in Russia, but that's not the only place where that happens.

The Intourist chairman was a tall man with somewhat angular face, not typical of most Russian types. I would judge him a man of some ability. Certainly his position rates quite high in the scheme of things. He was most pleasant. He had granted the audience only because I was a tourist. He would have refused to see me as a journalist. He emphasized that the U.S.S.R. welcomes tourists from everywhere and prefers to have groups because of easier handling, but individuals are welcome, too. He assured me I would be welcome to return and see much more of the country.

I tried for a week to see someone in Aeroflot, the Russian airline. I was advised that Aeroflot knew of me and they knew I was in Moscow. But no soap. I never got to see anyone with the airline.

(To be Continued)

Looking west with the Kremlin on the left and the Lenin museum in background. To left of WWP is the Lenin-Stalin mausoleum.

Looking north toward the Gom department store.

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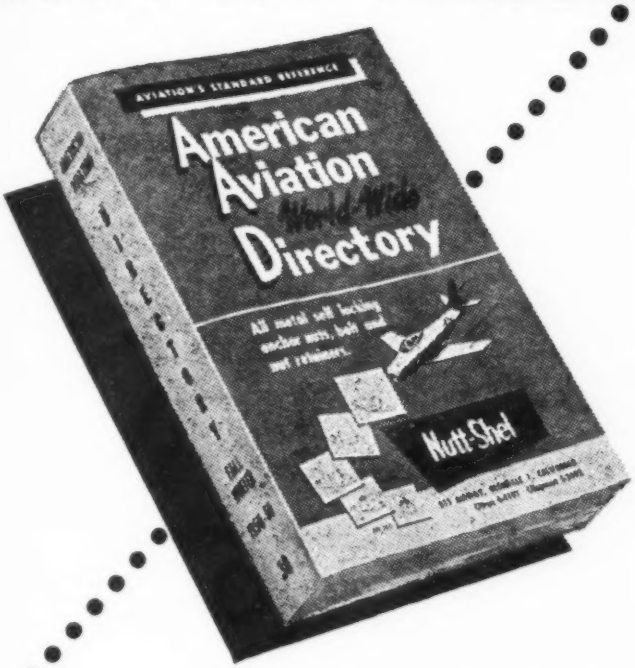

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DC AMPLIFIERS. A 4-page data folder offered by the Fielden Instrument Division, Robertshaw-Fulton Controls Co., contains descriptions and schematic drawings of typical applications of its Series 80 dc amplifiers, designed for most industrial and laboratory direct-current measuring problems.
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CAPACITORS. Filtron Co., Inc. offers a catalog describing its new line of subminiature low-pass feed-through suppression capacitors, for 5-amp. and 10-amp. service.
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RACK & PANEL CONNECTORS. A 14-page catalog (R2) issued by the American Phenolic Corp. contains a complete list of rack and panel connectors, with dimensions, current ratings and availability.
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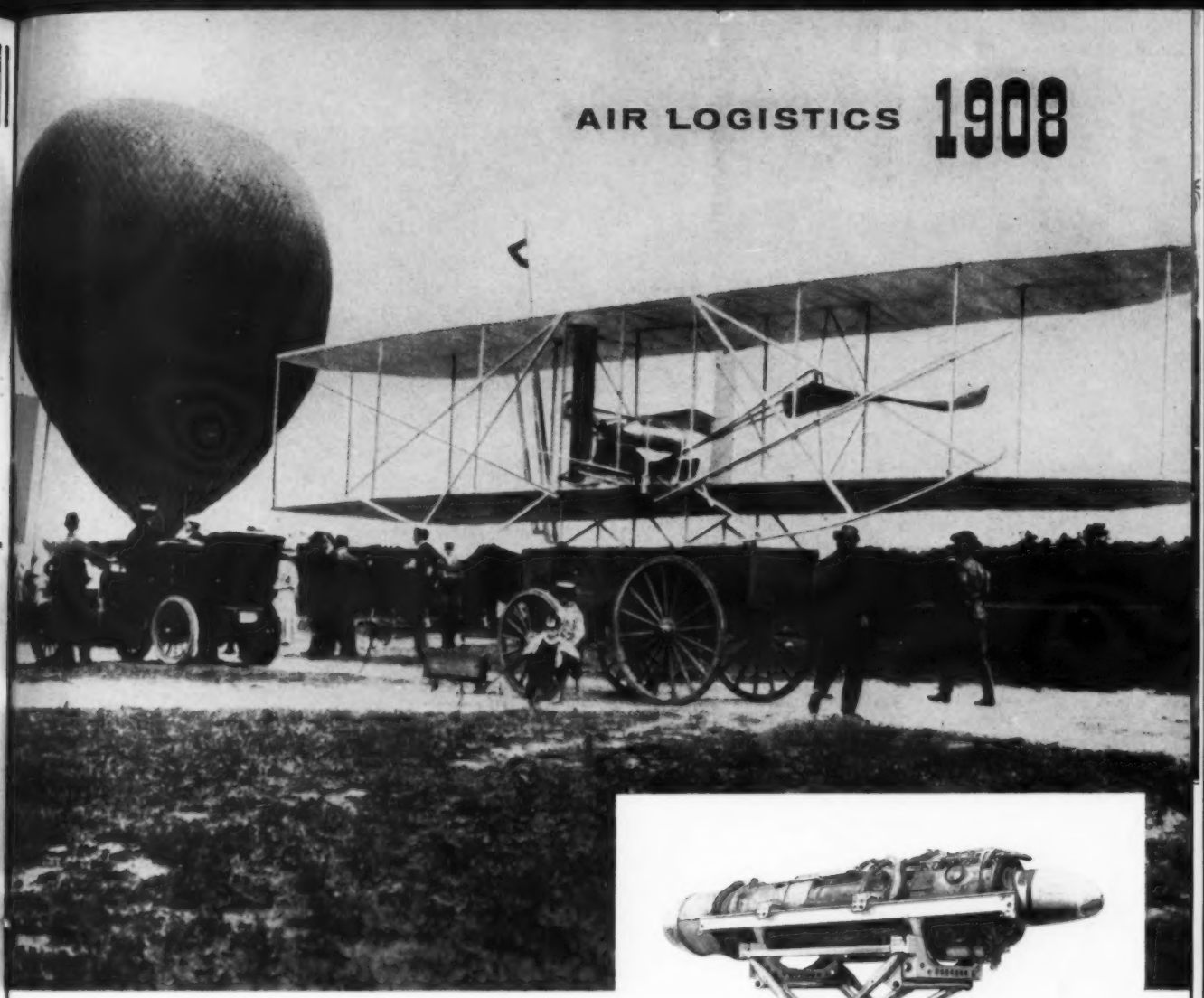

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